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Improvement in the Steam Engine.

The accompanying engravings represent a new steam engine, containing several novel and useful features not previously brought before the public. It is the invention of Tisdale Carpenter, of Providence, R. I., and is the subject of four distinct Letters Patent, three of which were procured through the SCIENTIFIC AMERICAN Patent Agency, and bear date April 8, 1862. We will proceed to describe the mechanism and operation of the engine, after which the alleged advantages procured by these new improvements will be stated.

The cylinder, of the usual form, is jacketed or inclosed, together with the steam chest, in the rectangular wooden box, A, Fig. I, the steam chest being over the cylinder in the ordinary manner. The ports for the entrance and exit of the steam are made in the cylinder heads, thus reducing the clearance space to the smallest dimensions possible.

The arrangement of the valves is shown in Figs. 2 and 3 ; Fig. 2 being an end view of the cylinder, with a portion of the jacket removed, and Fig. 3 a vertical longitudinal section of the cylinder head and valves. The induction valve, *b*, has a reciprocating vertical motion, rising to open the port and descending to close it. The steam comes from the passage, *c*, and remains outside of the valve until the port is opened, pressing the valve against its seat.

The eduction port is closed by a valve, *d*, which has a reciprocating motion to and from the cylinder head, in a direction parallel with the axis of the cylinder. This valve is inclosed in a box, as represented in Fig. 3 ; the steam passing out beneath the cylinder to the exhaust pipe. The upper face of the valve, *d*, is grooved to receive the packing, by which it is made to work steam tight in its box. The course of the steam is clearly indicated by the arrows.

The apparatus for opening and closing the valve of the induction port is peculiarly novel and ingenious. The valve stem is connected with an arm on the rock shaft, *f*, and arms, *g g*, upon the opposite side of the shaft carry the rod, *h*, which fits loosely in its bearings at the ends of the arms. Upon the end of the rod, *h*, is a roller or button, which enters between the horizontal disks, *i i*, on the vertical shaft, *j*. The shaft, *j*, is caused to rotate by means of a train of gearing from the main shaft, carrying with it the disks, *i i*. In order to impart the rocking motion to the shaft, *f*, the lower disk, *i*, has a slice cut from its upper surface on one side, and a corresponding projection is formed on the lower surface of the upper disk. This causes the space between the disks to bend downward in one portion of its circuit, and when this portion encounters the button on the end of the rod, *h*, this rod is carried downward, rocking the shaft, *f*, and raising the valve, *d*, thus opening the induction port. This downward bend in the space between the two disks, *i i*, may be made of such extent as to keep the valve open during any desired portion of the stroke. It is also so fashioned that when the button on the end of rod, *h*, is carried inward toward the center of the disks, the valve will be opened for a shorter space, and cut off steam earlier in the stroke, and this carrying inward is effected by the rising of the governor balls, through a simple and ingenious mechanism, which it is not intended here to describe.

The valves of the eduction ports are operated by the eccentric, *k*, on the lower end of the shaft, *j*.

One of the novel features in this engine is the plan for greasing one of the ways of the crosshead. The ways are placed one directly over the other, and the sides of each meet at an angle forming a trough, which is covered at the ends so as to form a hollow triangular prism, and the lower shoe of the crosshead is made hollow. An ample supply of oil is poured into the lower trough, and as the crosshead pushes this oil into the covered ends of the trough it is dashed over and into the hollow shoe, from whence it is distributed along the way on the return stroke. The upper trough or way is oiled in the usual manner.

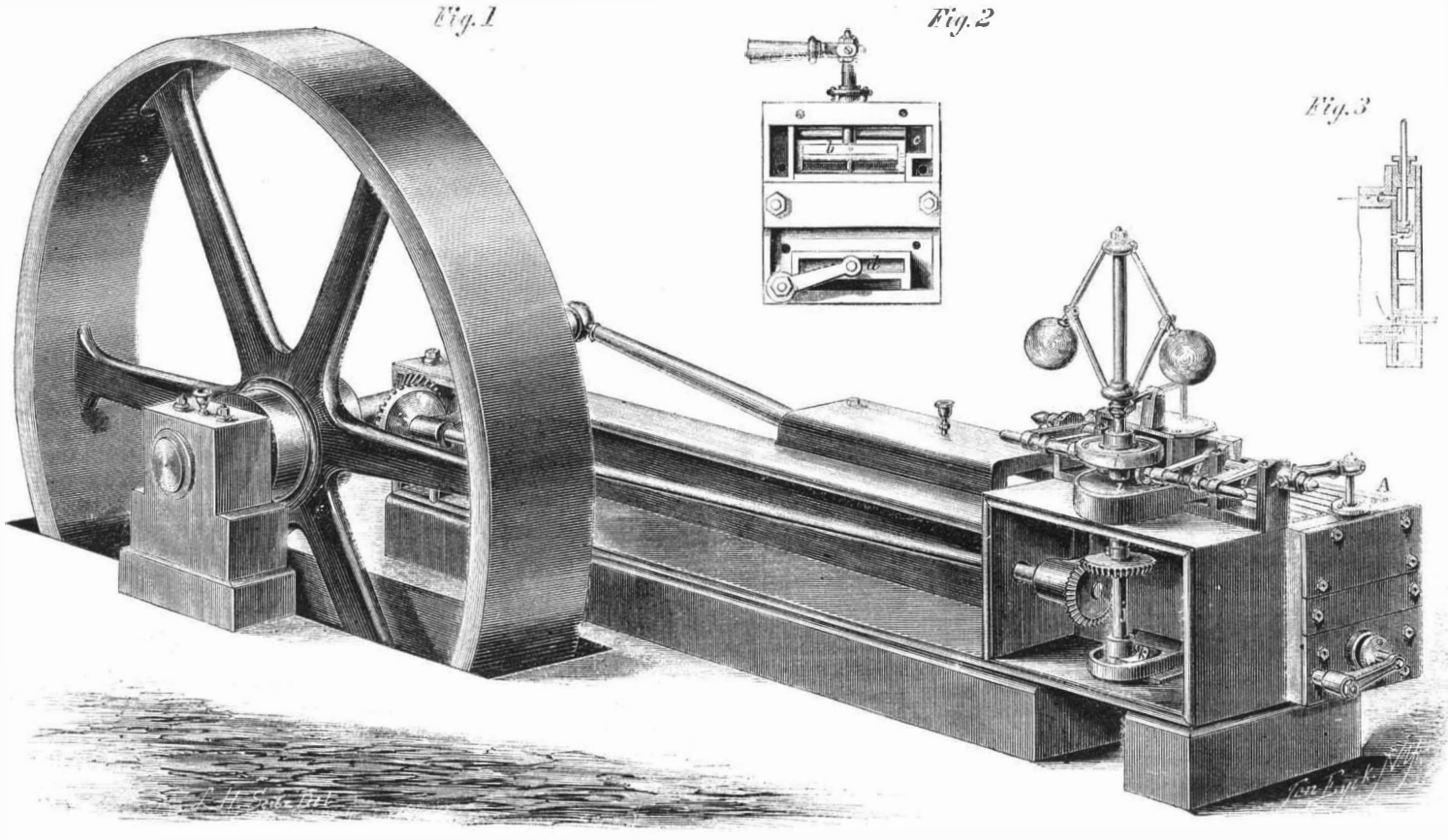
Another invention embodied in this engine is the mode of packing the piston. This is illustrated in Figs. 4 and 5 ; Fig. 4 being a longitudinal and Fig. 5 a cross section. A is the piston head, B the follower and D the packing ring, represented in the cut as a single ring, with a lap and tongue joint, *d*. Within the ring is the hub, *a*, secured to the piston rod, and having the projections, *b b*, *b'* and *b'*. Upon each side of the joint is a hook, *e* and *e*, formed upon the packing ring, and these hooks are caught by the hooks, *f f*, upon the spring, C, so that the elasticity of this spring tends to draw the ends of the ring, D, apart at the joint, and thus expand the ring. The spring, C, bears against the projections, *b' b'*, on the hub, and its tension is adjusted by screwing the nut, *h*, outward or inward, upon the screw, E. The turning of the ring is prevented by the screw fitting between the two lugs, *g g*, which are formed on the inner surface of the ring.

The qualities claimed to be embodied in these improvements are, first, an automatic cut-off, regulating by the steam valve, using the steam at its full press-

Fig. 1

Fig. 2

Fig. 3



CARPENTER'S IMPROVEMENT IN THE STEAM ENGINE.

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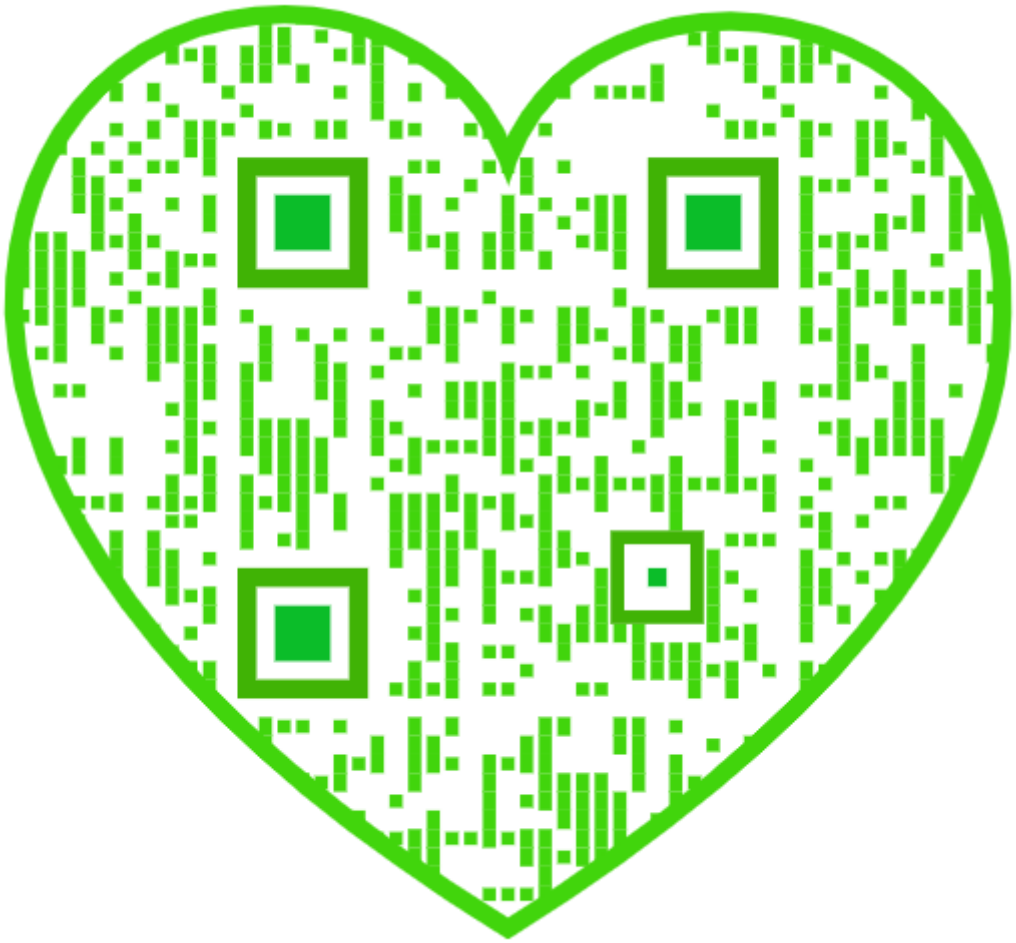


ure; variable throughout the entire length of stroke of the engine, and both opening and closing the steam valve with a positive motion, without the use or intervention of weights, springs, or any other contrivances of the kind. Second, the exhaust valves are worked with an intermittent motion, being moved quickly at the proper time, and then remaining stationary during the rest of the stroke; this gives a freer exhaust, because the motion of the valve is so rapid that it is not necessary to begin closing the exhaust port in front of the piston so early in the stroke as when the valves are moved by an eccentric. Third, the steam and exhaust valves are both placed in the cylinder heads; this allows the valves to be brought nearer to the interior of the cylinder than any other arrangement, and, of course, reduces the amount of waste space in the steam passages and clearance at the ends of the cylinder to the smallest possible quantity—the engine being in this respect

Fig. 4.

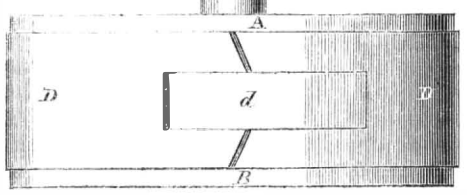
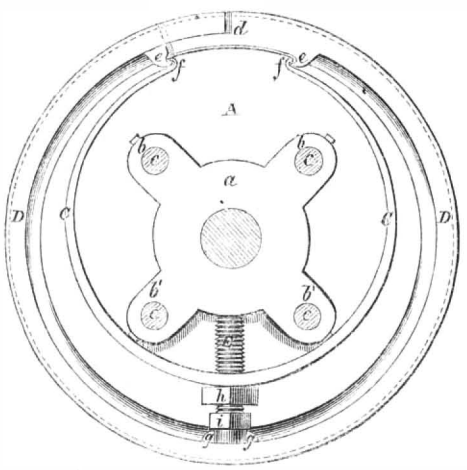


Fig. 5



superior to any other now in use, and absolutely beyond improvement. The arrangement also allows the valves or interior of the cylinder to be easily examined, and involves no difficulty whatever in packing the steam joints, beside the valves are of the simplest sliding form, without complication in any manner. Fourth, the engine combines with these qualities the most perfect regulation, the governor being almost entirely divested of any labor, and only required to indicate when a change should be made. It is also perfectly free to act in either direction at any time during the entire stroke of revolution of the machine. Sixth, the piston packing, in addition to its cheapness will, from the peculiar arrangement of the spring, be very elastic when first set in the cylinder, and will remain steam-tight for a much longer time or degree of wear on the outside of the rings than any other method. Seventh, the self-oiling slide is a source of convenience, neatness and economy combined with no perceptible added cost to the machine. Finally, the engine, as a whole, is very compact, durable, cheaply constructed, and combines more good qualities, with the addition of some not found elsewhere, with fewer parts than can be obtained in any other machine.

Further information in relation to this invention may be obtained by addressing the inventor, Tisdale Carpenter, at the Phenix Iron Foundry, Providence, R. I.

THE rebels of the South have destroyed 128 lighthouses that have been erected by the United States for the benefit of commerce, endangering the lives of thousands in no way connected with the war.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION—RETREAT OF GENERAL BANKS.

The whole country was startled on Sunday the 25th ult. with intelligence that the command of Gen. Banks, which had so successfully liberated the rich valley of the Shenandoah, had been overwhelmed by a large force of the enemy, and that he had retreated into Maryland. It also appeared to the bewildered public that the enemy designed to pursue him into that State by rapid forced marches, and thus perchance move upon Washington, and take it by a spirited *coup de main*, thereby giving the *coup de grace* to Mr. Lincoln and his government. Thus while Gen. McClellan was threatening the seat of the Confederate government at Richmond, Gen. Stonewall Jackson was leading almost the whole Confederate force down upon the seat of Federal power; nor was the public so much to blame for all this alarm. The telegraph told us that government had taken possession of all the railroads, the State Governors were called upon to send forward all the military forces at their disposal to defend the city of Washington, thereupon Governor Andrew of Massachusetts rushed into Boston Common and with stentorian voice called on the whole militia force of that noble State to assemble the next day and fly on to the relief of the beleagured city. It looked as though the war had just broken out, and the people were called to arms! to arms! in defence of their government and country. As we in New York saw the gallant "Seventh" once more hurried through our streets to defend Washington and the government, and other regiments equally gallant, ready to follow, we could scarcely realize that hundreds of thousands of men, and millions of money, had been placed under government control for this very purpose, and that all our prodigious efforts of the year past had come to "a lame and impotent conclusion." It is true that Banks and his command have been forced to retire into Maryland, and it is also true no doubt that there is a large force of the enemy in the Shenandoah Valley, but when the facts became well understood by the people, the fright of Sunday and Monday appears to have been the result of irrational and absurd fears.

The *National Intelligencer*, in referring to the representations that the insurgents again menace the National Capital, says, "besides creating a false alarm, they are unjust to the military dispositions the government has made for the protection of this city, while their only effect abroad can be to produce a factitious impression, more complimentary to the military strength of the insurgents than the facts of the case can be held to warrant."

The absurd rumors which find currency among idlers, *quid nunes* and secession sympathizers, have only served to show how greatly the power of the government can be increased in case of an emergency. Thousands of troops are ready to proceed with all possible haste to answer the call of the government and it may turn out that the attack upon and repulse of Gen. Banks's small command will prove to be one of the best things possible that could have happened in once more stiring up the government and the people to a full realization of the fact that the rebellion is a giant and not a pigmy. Gen. Banks's army was originally 35,000 strong, but in order to meet a greater exigency it was gradually reduced to about 5,000 men. This fact, though not known to us, was fully known to the enemy, and hence the attack. The retreat of this small force of Gen. Banks in the face of so large an opposing force, was well conducted, and reflects much credit upon his bravery and energy. He lost considerably, as a matter of course, but was able to damage the enemy to a very great extent. We much regret that the First Maryland regiment under command of the brave Col. Kenly, was surprised at Front Royal, and terribly cut up; the gallant Colonel having been brutally shot while lying wounded on an ambulance. This, we understand, is a well attested fact, and shows how horribly war can be rendered by an infuriated enemy in moments of temporary excitement and victory. The particulars in reference to the losses of Gen. Banks are not known, but from all we can gather we should think them not serious.

The object of the government in calling for more troops is doubtless to garrison the fortifications about Washington with new forces and send those now stationed there, to reënforce Gen. McClellan and Gen. Banks. The President assumes all the responsibility of these changes, and we trust it will in the end appear that the recent movements will result in great advantages to the loyal cause. The people will hold the President to a strict account if he fails to make good use of their lavish sacrifices to sustain him.

AFFAIRS BEFORE RICHMOND.

Gen. McClellan has not yet made an attack on Richmond for the best of all reasons, viz., that he is not quite ready. He must provide every thing necessary for success and know the whole ground before he ventures to hurl his battalions against or upon the great army in and around that city. Gen. McClellan is cautious and his men love him, and when the action fairly begins (supposing the enemy will stand their ground) we may expect to hear of a brilliant fight. In all the battles and skirmishes thus far on the way to Richmond his success has been steady. At last accounts Hanover Court House had been taken by our forces after a sharp fight. This place is on the line of the Richmond and Fredericksburg railroad, not far from the former city, thus cutting off the retreat by railroad of any Confederate troops that may stand between McDowell's forces and those in front of Richmond. We hope soon to hear of the union of all our forces on the Rappahannock with those near Richmond, in which case our success would be almost as certain as any future event which we are accustomed to regard as sure to take place. It is alleged that the secession army is now mainly encamped at Manchester, opposite Richmond. We shall probably know all about this matter in a few days, perhaps in a few hours.

TWO HUNDRED THOUSAND FRESH TROOPS WANTED.

Senator Wilson, of Massachusetts, has introduced a bill into the Senate, legalizing the President's act in calling for fifty thousand additional troops, and empowering him to call for one hundred and fifty thousand more. This is right, and it should have been done before. The whole of this force could be advantageously employed to-day. Gen. Butler needs reënforcements; Gen. Hunter is calling for more; Gen. Burnside cannot enter the heart of North Carolina with his present force; Gen. Fremont wants more men, and we say emphatically, let us have more than enough rather than be deficient at any point. Considering the immense force of the enemy and the great decrease of our armies by losses in killed, wounded, sick and taken prisoners, no one will fail to see the impropriety of the decision of the government to stop all recruiting. Our theory is to take all the men you can get, and thoroughly arm them, and thus make the contest what Gen. McClellan declared it would be, "short and desperate."

AFFAIRS AT NORFOLK—CONDITION OF THE NAVY YARD.

There is but little change in the condition of affairs at Norfolk. The Mayor and members of the City Councils still refuse to take the oath of allegiance. Gen. Wool has had an interview with them, but they continue in the sulks, so that he now refuses all intercourse between the People of Norfolk and Portsmouth. Even the little business they have been doing in the way of strawberries and peas is now stopped.

General Wool has sent up a proclamation to Norfolk notifying the people that the matter was entirely in their hands. So soon as they acknowledge the supremacy of the government they will enjoy its fostering aid, but while they remain in their present rebellious mood they will be cut off from all advantages of trade and commerce, and the city will be governed by strict martial law. He also assures them that no contingency can possibly arise whereby Norfolk will again be given up to the control of the Confederate government, and that those who entertain Union sentiments can give expression to them, with ample assurance of protection of all their rights as citizens of the United States,

The walls of the navy yard building at Norfolk are in a solid condition, and can soon be put in order again. The machinery was taken out of the buildings before they were fired, and packed up with the intention of being removed, but the rapid action of General Wool prevented the removal.

Numerous wrecks sunk in the harbor and river by the rebels are all to be removed forthwith, including the wrecked *Merrimac*. A large number of fuses and shells have been removed from the latter.

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MISCELLANEOUS.

Captain Bailey, second in command of the New Orleans expedition, says the action on the Mississippi has illustrated two principles: first, that no forts could prevent such a fleet as we had at New Orleans from passing up New York harbor to the city, and up the Thames to London Bridge; second, that we must build more iron gunboats, and put one in every river in Secessia, if necessary, as the sure and effective method of keeping the rebellion in check.

The railroad bridge at Nashville over the Tennessee river is progressing rapidly, and the eastern span is now nearly finished. The western span and the draw are now in progress, and the contractor, Mr. Bent, intends to finish it early in June. This reparation of injury done by the enemies of our peace will be of great benefit not only to the city of Nashville, but also to the public.

The Western Sanitary Commission, whose headquarters are in St. Louis, report that the whole number of patients admitted into the fifteen hospitals under their care, to date, is 19,467. Of these 1,400 have died. There have been 169 additional deaths on floating hospitals in transit, at McDowell's military prison, the St. Louis Arsenal, and at private houses, thus making the grand total 1,569; 15,717 have been furloughed, discharged, or returned to their regiments, and 3,750 remain.

Pensacola, which is now occupied by Federal troops, has direct railroad communication with Montgomery, Ala., the former capital of the Confederacy, from which it is less than 150 miles distant—the route being shorter by one-half than that (by water) from Mobile. It is, in fact, the key to the Alabama territory—a very important "fire in the rear" of the Confederacy.

The Vicksburg *Citizen's* correspondent, writing from Jackson, Miss., under date of the 18th ult., says: Five Yankee gunboats arrived within range of our batteries yesterday. At noon, the commander sent a flag of truce demanding the surrender of the city. The response sent back was: "If you want the city, come and take it."

The commander of the fleet also, it is supposed, demanded the surrender of our forts just below Vicksburg, which was also peremptorily refused. After this, the Federal gunboats weighed anchor, and dropped down the river to bring up the rest of the fleet, for the purpose of opening a bombardment.

Commodore Farragut will no doubt accommodate these Vicksburg people by taking their town. He is the very man who knows how to do it.

The Charleston *Courier* of the 12th congratulates the citizens of Charleston upon their being four times stronger than at New Orleans. Large consignments of stones from Columbia and iron chains and other materials will soon be on their way to aid in constructing a stone wall to block out the invaders from approaching within shelling distance of the city.

Interesting Facts about the "Merrimac."

The history, the early triumph and final destruction of this extraordinary craft—the first iron-clad war vessel ever brought into action—render the following account of her interesting. Mr. Diggs was one of the head workmen employed by the United States government in the Gosport Navy Yard, and was compelled either to starve or to serve the Confederates. He assisted in cutting down and fitting up the *Merrimac*. He says that her top was flat and covered with a grating made of several cross layers of 1¼-inch square bar iron, strongly riveted and bolted together. Her roofing consisted first of 15-inch rafters, of 10-inch thickness, and lying close side by side. Across these, lying fore-and-aft, was a roofing of 5-inch pine plank. Next came four inches of oak plank, up and down. This made a roof of two feet thickness of solid wood, all firmly bolted and barred together—the whole being secured and steadied by strong iron braces and bolts, running crosswise as well as fore-and aft. Next, on top of the oak plank, came a layer of 2-inch iron, the bars running fore and-aft. Across this was another layer of iron, same thickness, up and down. He saw her when she returned, after her first fight with the *Monitor*, and the injury done her was as follows:—One gun broken short off near the trunnions, and another broken obliquely, about eighteen inches from the muzzle. Her stem was mashed so that the wood could be strung out like a ball of thread; and they had to squeeze a whole bale of oakum into it to stop the leak—the planking being sprung off and gaping wide. Quite a number of the *Monitor's* shots had plowed up the roofing so that you could lay a large watermelon in the spot where the shot had struck. Upon making inquiry he learned that two men were killed, but he thinks there must have been more. He says had the *Monitor* followed her up she could have captured the rebel bugbear in another half hour; and yet the rebels would "blow" about her being able to whip a half dozen *Monitors*.

The New Ironsides.

The following are the dimensions of the iron-plated ship recently launched in Philadelphia:—

HULL (WOOD).

Length	232 feet.
Length between perpendiculars	230 feet.
Beam	57 feet 6 ins.
Depth of hold	17 feet.
Tunnage by measurement	3,436 tuns.
Draft of water at deep-load line	15 feet.
Displacement	4,120 tuns.
Immersed sectional area	809 sq. feet.
Immersed section per square foot of screw's disk	6·09
Angle of entrance at load line	92°
Angle of departure	166°
Area of immerged portion of hull	16,325 sq. feet.
Weight of hull, *per se*	2,000 tuns.
Estimated weight of armor	750 tuns.
Bark rigged.	

BATTERY.

16 9-inch Dahlgren guns, eight on a side.

Weight of guns	152,000 lbs.
Weight of metal thrown at one broadside (shell)	592 lbs.
Ditto (shot)	800 lbs.

ENGINES.

She is supplied with two horizontal direct-acting engines.

Diameter of cylinders	50 inches.
Stroke of piston	30 inches.
Surface condensers, condensing surface	3,000·3 sq. feet.
Diameter of air pumps	12½ sq. feet.
Stroke of air pumps	30 sq. feet.
Diameter of circulating pumps	11 sq. feet.
Stroke of circulating pumps	30 sq. feet.
Lap on steam valve, steam side	1½ inches.
Lap on steam valve, exhaust side	¼ inches.

BOILERS.

She is furnished with four horizontal tubular boilers.

Heating surface to top of tube box	8,450 sq. feet.
Grate surface	355·44 sq. feet.
Ratio of grate to heating surface	1 to 23·7.
Estimated consumption of coal per sq. feet of grate per hour	12·6 lbs.
Estimated water evaporation per lb. of coal	8·5.
Estimated consumption of coal per 24 hours	48 tuns 840 lbs.
Artificial draft.	

PROPELLER.

One composition screw.

Number of blades	4
Diameter	13 feet.
Pitch—15 to 17 feet mean	16 feet.
Length	29 inches.

From calculations carefully made it is estimated that the speed of this vessel, under favorable circumstances, will be about 9 knots an hour.

Comments of British Newspapers on the Capture of New Orleans.

The capture of New Orleans by the Union army has been very widely commented on by the London Journals. It is acknowledged by the London *Times* that the taking of New Orleans is a great triumph for the North. That paper says the United States Ministers in London and Paris had been "told to assure the European governments that plans are being matured for a mitigation of the blockade." The writer entertains no doubt of the sincerity of the intention of the Federal Cabinet in this direction, and states that, with the fall of New Orleans, there is "an end to the blockade of that city." Only one thing was wanting, in his opinion, and that was that "cotton should come down" to New Orleans. Should the rebels destroy the stock, he adds, "it is hard to see what is gained by the capture." The London *Post* and *Herald*—the organs of the Cabinet and extreme aristocrats—were inclined to underrate the value of the achievement, so far as commercial benefits to Europe were to be expected from it. The impression in Manchester was to the effect that the fall of New Orleans would bring forward more cotton.

The victory at New Orleans is important in England, it seems, only as it affects the supply of cotton to their suffering operatives. If cotton comes it is a great victory—if it does not the victory is of no account,

It was calculated that by the middle of May only 100,000 bales of American cotton would be on hand in Liverpool.

A Tribute by Prof. Agassiz to Dr. Bache.

Prof. Agassiz, in his article on "Methods of Study in Natural History," in the *Atlantic Monthly* for June, has occasion to allude to the investigations of the coral reefs by the Coast Survey, when he speaks as follows of Dr. Bache:

I cannot deny myself the pleasure of paying a tribute here to the high scientific character of the distinguished superintendent of this survey, who has known so well how te combine the most important scientific aims with the most important valuable practical results in his direction of it. If some have hitherto doubted the practical value of such researches—and unhappily there are always those who estimate intellectual efforts only by their material results—one would think that these doubts must be satisfied now that the Coast Survey is seen to be the right arm of our navy. Most of the leaders in our late naval expeditions have been men trained in its service, and familiar with all the harbors, with every bay and inlet of our Southern coasts, from having been engaged in the extensive researches undertaken by Dr. Bache and carried out under his guidance. Many, even, of the pilots of our Southern fleets are men who have been employed upon this work, and owe their knowledge of the coast to their former occupation. It is a singular fact that at this very time, when the whole country feels its obligation to the men who have devoted so many years of their lives to these investigations, a proposition should have been brought forward in Congress for the suspension of the Coast Survey on economical grounds. Happily, the almost unanimous rejection of this proposition has shown the appreciation in which the work is held by our national legislature. Even without reference to their practical usefulness, it is a sad sign, when, in the hour of her distress, a nation sacrifices first her intellectual institutions. Then more than ever, when she needs all the culture, all the wisdom, all the comprehensiveness of her best intellects, should she foster the institutions that have fostered them, in which they have been trained to do good service to their country in her time of need.

Since the first of October last the Panama Railroad has brought over the Isthmus 5,663 bales of cotton. The following was given:—

From Mexico, bales	2,589
From Central America	119
From South America	2,955
Total bales	5,663

This is not despicable for the first year's result. Most of this cotton went from Aspinwall to England, and was found to be of superior quality. The authorities are giving every encouragement to the production, but the indolence natural to the climate is found to be the most difficult obstacle to overcome, and one which can only be removed by immigration.

NEW BRANCH OF INDUSTRY.—At the instance of the Emperor immense reservoirs are to be dug at every port in France for the purpose of breeding fish for the consumption of the navy as well as for sailors in the merchant service. An immense revenue is expected from the adoption of the system. Salmon, turbot and codfish arrive in large quantities by railway during their respective seasons, and by the resources of chemical and locomotive science combined, generally get there fresh enough to disguise their origin. The Emperor's own table is wholly supplied by one of the great London dealers.

FRENCH PLAN FOR SINKING IRON SHIPS.—According to the *Courrier du Havre* of May 11th, a gentleman residing at La Rochelle, after two years' laborious experiments, has discovered the means of sinking any ship, no matter how thick its iron plates, by a combination of electricity and gunnery, of which a thoroughly unintelligible description is given. The inventor sent his discovery to the Emperor, and received a very flattering autograph letter in reply, accompanied with the cross of the Legion of Honor.

THE share of prize money which accrues to the Navy Department from the prizes taken during the war amounts already to a very large sum, sufficient to cover a large part of the outlay of the department in purchasing vessels for the blockading fleet.

THE people of Sweden—his native country—have voted Ericsson a medal for services in connection with the *Monitor*.

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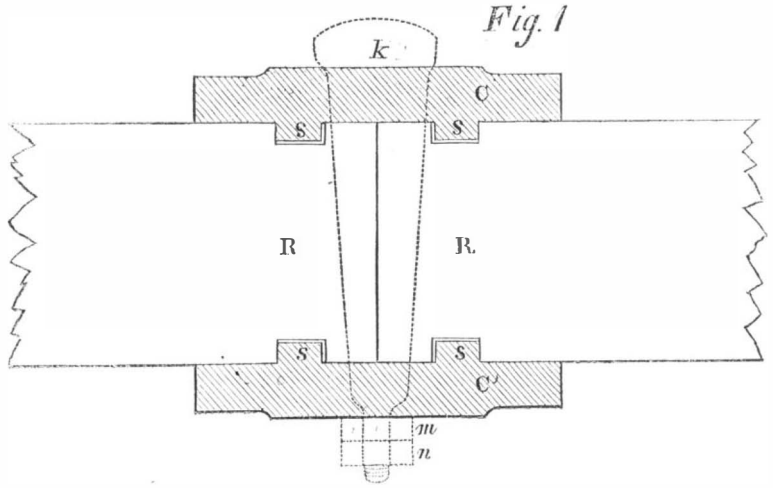
Improved Railroad Chairs.

The principal wear of railroad rails occurs at their ends, and it is, therefore, very important to have these parts finished by a nice joint, and to be well supported. To effect this it is customary to have the ends of the rails rest on cast-iron blocks, called chairs, of which a great variety have been devised. Some of them are divided into two parts, one on each side of the rail, and the annexed cuts illustrate certain improvements invented in this class of chairs by O. J. Hall, of Pittsford, New York, who has assigned the invention to himself and Franklin Decker, of the same place.

Fig. 1 is a horizontal section of the device; Fig. 2 is a vertical section, and Fig. 3 a perspective view.

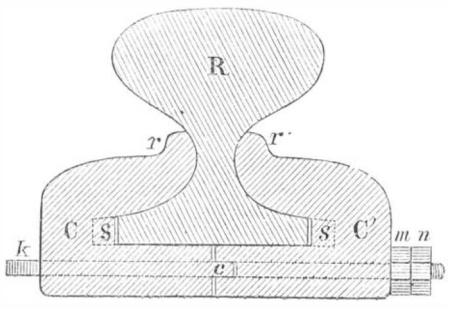
The rails, R R, have notches in their sides near their ends, and they are embraced by the two halves or sections, C C′, of the chair, which are furnished with projections or stops, *s s s s*, to fit into the notches in the rails. The sections, C and C′, are notched together by a tongue and groove, *c*, running their whole length, and they are held together by a tapering key, *k*, which is secured in place by two nuts, *m* and *n*, the outer nut, *n*, being employed to prevent the inner nut, *m*, from being shaken loose by the concussion and vibration from passing trains.

Fig. 1



HALL'S IMPROVEMENT IN RAILROAD CHAIRS.

Fig. 2



The notches in the rails should be one-fourth of an inch wider than the stops, *s s*, to allow for the contraction and expansion of the rails, caused by changes in the temperature. The shoulder on the key, *k*, should be a little within the surface of the chair, to permit the nut to be tightened in case the key should become loose.

This chair will be found particularly convenient for the hasty repair of a rail which may be broken a short time before a train is due. If the trackmen have a few of these chairs, without the stops, *s s*, they will be able very quickly to mend the rail so as to make it safe for the passage of trains until it can be replaced.

The patent for this invention was granted March 4, 1862, and further information in relation to it may be obtained by addressing Messrs. Hall & Decker, at Pittsford, N. Y.

The London *Times* says that the first of the large plate-bending machines for preparing and bending the armor-plates for the iron steamer *Achilles*, 50 guns, by means of hydraulic pressure, has been erected at Chatham dockyard, in the factory adjoining the dock in which the iron frigate is building. The plates are to be bent cold. "So great," we are told, "is the force required to effect this that the hydraulic engine can be worked up to a pressure of 2,000 tuns to the square inch!" A wonderful press, indeed!

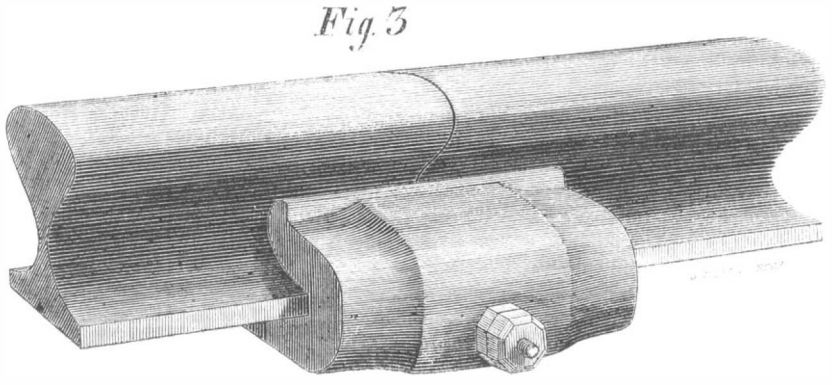
Curiosities of the Great Exhibition.

The London *Times* has the following notice of the optical instruments in the exhibition:—

The Italian makers in this country show some fine instruments, especially in binocular microscopes, as all the profession knew they would; but, on the whole, the English collection of instruments may safely defy competition. Negretti and Zambra exhibit a collection of optical instruments, and the most delicately sensitive self-registering thermometers and barometers. They also show an improved anemometer, which records on a sheet of paper the force, direction and velocity of the wind at every moment. The Right Hon. Robert Lowe, M.P., is also an exhibitor in this class, showing a curious pair of spectacles which magnify without glass or any other refracting medium. The collection of microscopes is, as we have said, unequaled, and with them Mr. Norman shows a wonderful series of microscopic slides containing minute sections and preparations of almost every conceivable object, animal or vegetable, from sections of the tooth of a lion to the liver or skin of a man, from the lungs of a boa constrictor to the palate of a toad or the tongue of an alligator. One of the most curious instruments in this extraordinary collection is a machine exhibited by Mr. Peters for microscopic writing, which is infinitely more wonderful than Mr. Whitworth's machine for measuring the millionth of an inch, which excited such astonishment in 1851. With this machine of Mr. Peters it is stated that the words "Matthew Marshall, Bank of England," can be written in the two and a half millionth of an inch in length, and it is actually said that calculations made on this data show that the whole Bible can be written twenty-two times in the space of a square inch. We must leave a detailed description of this extraordinary instrument to another occasion, and content ourselves now with simply saying that the words to be written microscopically are written in pencil, in ordinary characters, on a sheet of paper at the bottom of the instrument. But the pencil with which this is done communicates by a series of levers and gimbals with another minute pencil and tablet at the top, by means of which the ordinary writing of the pencil and the pencil for the microscopic writing both move in unison, though the motion of the latter is so graduated that a stroke of a quarter of an inch at the bottom is only a stroke of a quarter of a millionth of an inch at the top, the shape and character of both marks being nevertheless precisely alike in outline. As a matter of course, the microscopic writing at the top is only visible under powerful magnifiers, and the object of the machine is chiefly to mark bank notes with certain minute signatures for the prevention of forgery. Such a precaution, no doubt, would prove an effectual stopper on counterfeit notes, if only tradesmen supplied themselves with microscopes to examine them, just as a little ordinary care would detect any forgery.

Close by this curious instrument is another more curious still, with the existence of which the public are already no doubt aware from the fines inflicted on musical Savoyards who would play their organs in front of Mr. Babbage's house. This is Mr. Babbage's great calculating machine, which will work quadrations and calculate logarithms up to seven places of figures. It was the account of this invention written by the late Lady Lovelace—Lord Byron's daughter—that led the Messrs. Scheutz, of Stockholm, to improve upon it to such an extent as not only enabled the machine to calculate its tables, but to print its results. This improvement was at once bought up by the English government, but it is not now shown at the exhibition, as it is very busy at Somerset House night and day working out annuity and other tables for the Registrar General. The small and by no means complicated machine of Mr. Babbage is in the gallery, however, and we can only echo the regret expressed by all the many visitors who come to see it that there is no one in attendance to show and explain its mode of working. Near this, also, are exhibited bullion scales, which, when weighed with 3,000 ounces, turn with the addition of a single grain, and scales for chemical experiments which the thousandth of a grain will move. Of course, these latter are under glass cases, as the addition of a sunbeam either way would almost suffice to turn them, and a moment's exposure to dust would instantly throw them out of order. Wheatstone will also show in this class a collection a philosophical and scientific instruments, and, among others, his domestic telegraph in working order.

Fig. 3



Feeding and Watering Horses.

The following abridged observations of a French writer are deserving the attention of all who have horses under their care:—

The same quantity of oats given to a horse produce different effects according to the time they are administered. I have made the experiments on my own horses and always observed there is a quantity of matter not digested, when I purposely gave them water immediately after a feed of oats. There is decidedly, then, a great advantage in giving horses water before grain is fed them. There is another bad practice, I observe, that of giving grain and hay on their return to the stable immediately after hard work. Being very hungry they devour much food eagerly, and do not properly masticate it; the consequence is that it is not well digested, and not nearly so nutritious. When a horse returns from work, perspiring and out of breath, it should be allowed to rest for a time, then given a little hay; half an hour afterward, water, and then oats or other grain. By this plan water may be given without risk of cold, as the oats act as a stimulant

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In an iron mine near Durham, England, there has been lately discovered a curious cave, adorned with stalactites, and containing the bones of a fossil man

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Association was held in their room at the Cooper Institute on Thursday evening, May 22d, the President, Prof. Joy, in the chair.

The only miscellaneous business introduced was the presentation to the society of J. W. Nystrom's book containing an exposition of his

NEW SYSTEM OF ARITHMETIC,

with 16 for the base in place of ten in the present decimal system. The work was referred to a committee, and the society proceeded to the discussion of the regular subject of the evening—

PRINTING IN COLORS.

Mr. FISHER—It is well known that the success in printing in colors has been very imperfect, and I suppose that this is owing to the want of artistic knowledge and taste on the part of the operators. Brewster ascertained that all colors are formed by the combination of three: red, yellow and blue, which he called the primary colors. Now, I suppose that if these three were properly blended, all colors and all shades of color might be produced. Perhaps black might also be employed with advantage. I suppose that nine-tenths of the colors and shades employed in portrait painting might be produced from red, blue and black.

Dr. STEVENS—Probably the man who first printed in colors was Faust. Before the art of printing with movable types was invented it was customary to ornament the manuscript books with illuminated letters of various colors, and in order to make the printed books as nearly like those in use as possible, the printers undertook to print their initial letters in colors, and they produced some very fine results. But the practice after a while fell into disuse. At the present time printing in colors is carried on in this country with very satisfactory results, though not so well as in England and Germany. Maps especially are printed in this way, so as to rival those colored by hand. Prof. Rodgers, formerly of this country, but at present of Edinburgh, had a geological map printed in this way, which is nearly, if not quite, equal to any colored by hand. Each color is put on by a separate stone; though after all of the sheets are printed in one color from a stone, the color may be wiped off, and the same stone may then be prepared for another color, with which all of the sheets may be printed.

Mr. GAVITT—Mr. President, I received your invitation so short a time before the meeting that I have made no preparation, and my remarks must be very desultory. The American Bank Note Company print their bills in colors as a guard against counterfeiting by the photographic process. If a bill is printed partly in red, the counterfeiting photographer must remove the red before he photographs the rest of the bill, and the red must then be printed in. The colors formerly used could all be readily removed, but it was suggested by one of the most eminent chemists in the world, Mr. Sterry Hunt, that the sesquioxide of chromium would be found as permanent as the black carbon ink. We have accordingly adopted this pigment, and hence the great quantity of green you see in modern bank notes, especially in the United States Treasury Notes. The sesquioxide of chromium resists the action of all acids except boiling nitric acid, and that destroys the texture of the bill. The only way in which it can be removed is by saponifying the oil which is employed as a medium to attach it to the paper, and as the same medium is used for the carbon ink, if one is removed they both go together. We print the green over the black, and this we consider a perfect safeguard against counterfeiting by photography.

Prof. SEELY—I think, Mr. President, that this apprehension of counterfeiting by photography is a bugbear. I have frequently heard of bank notes that were counterfeited by photography, and I have been told that if I would go to this place or that place, I should see one so perfect that it could not be distinguished from the genuine note. The narrators seem not to have considered that this fact would destroy the evidence of its being a counterfeit. If it could not be distinguished from the genuine bill how can it be known that it is not genuine? And I presume that in most of the cases in which it was supposed that bills had been counterfeited by photography, genuine bills were mistaken for counterfeits. I have seen photographs of bank notes; I have made some myself, but I never saw one that could not be readily detected, or that had been in circulation. Here is a bill printed wholly in black, and there are a great many such in circulation. If it is so easy to photograph black notes why are not these counterfeited. It must be either because photographers are not able to do it, or because they are all too honest.

Mr. GAVITT—Mr. President, I will ask Prof. Seely one question. Here is a bank note with the letters, ONE, in red; now, is it more difficulty to photograph that note than it would be if those letters were printed in black?

Prof. SEELY—It is more difficult, certainly.

Mr. GAVITT—Very well, Mr. President, that is sufficient. I hold that it is the duty of bank officers to furnish the community with every possible safeguard against the danger of being swindled by false notes, and if it is in any degree more difficult to counterfeit a note printed in colors, then all notes should be printed in colors without any regard to the expense. I agree with Prof. Seely that the danger of circulating photographs of bank notes is a bugbear, but photography may be employed to produce lithographs of bank notes, which are the most dangerous counterfeits. There was a publication of a bank note detector started a few years ago on a new plan. It was to have facsimilies on a small scale of all the genuine bank notes in the country. You probably remember the work. Photographs were taken of just one-sixth the size of the bills, and then these were transferred to stone by the photo-lithographic process, and the bills were then printed from the stone. The photographs were made by Mr. Rehn, one of the most skillful photographers in the world, and the prints were perfect copies of the bills. It was only necessary to take a glass that would magnify just six times, and you had the exact thing. The most delicate lines were all reproduced with wonderful accuracy. Some of these lines, being so much reduced in size, were absolutely finer than the fiber of the paper, and we were obliged to have a cardboard surface in order to print them. But, of course, if not reduced they might be printed on bank-note paper. Counterfeiting by photography is a bugbear, but not by photo-lithography.

Mr. ROWELL—Have any of the United States Treasury Notes been counterfeited?

Mr. GAVITT—They have not?

The PRESIDENT.—How much of the sesquioxide of chromium is used for bank-note printing?

Mr. GAVITT—Nearly all that is used is used by the American Bank Note Company. We have consumed about 10,000 lbs. within the last three years. It costs about a dollar a pound in large quantities.

The PRESIDENT—There is a process of printing in colors practiced in Germany, called nature printing. A natural object—a leaf for instance—is placed under a thin sheet of pure lead, and passed between rollers. The leaf is pressed into the lead, forming a mold for an electrotype plate, which is employed for printing. Inks of the proper color are used in the printing, and where several colors are required they are worked on the same plate so as to print the whole at one impression. The Consul General of Austria, Charles F. Loosey, presented several magnificent volumes of these prints to the American Institute a few years ago. It was a most valuable and acceptable donation, and I trust was properly recognized and appreciated.

A volume of the prints was brought from the library and greatly admired by those present.

The subject of "Illuminating Materials" was selected for the next meeting, and the society adjourned.

History of Columbiads.

Benton, in his work on "Ordnance and Gunnery," recently noticed in the SCIENTIFIC AMERICAN, gives the following history and description of columbiads:—

The columbiads are a species of sea-coast cannon, which combine certain qualities of the gun, howitzer and mortar; in other words, they are long, chambered pieces, capable of projecting solid shot and shells, with heavy charges of powder, at high angles of elevation, and are, therefore, equally suited to the defence of narrow channels and distant roadsteads.

The columbiad was invented by the late Colonel Bomford, and used in the war of 1812 for firing solid shot. In 1844 the model was changed, by lengthening the bore and increasing the weight of metal, to enable it to endure an increased charge of powder, or one-sixth of the weight of solid shot.

Six years after this it was discovered that the pieces thus altered did not always possess the requisite length. In 1858 they were degraded to the rank of shell guns, to be fired with diminished charges of powder, and their places supplied with pieces of improved model. The changes made in forming the new model, consisted in giving greater thickness of metal in the prolongation of the axis of the bore, which was done by diminishing the length of the bore itself; in substituting a hemispherical bottom to the bore, and removing the cylindrical chamber; in removing the swell of the muzzle and base ring, and in rounding off the corner of the breech.

From the fact that all the trial pieces have successfully endured very severe tests, it is to be inferred that the defects of the previous model arose from the presence of a cylindrical chamber, and a deficiency of metal in the prolongation of the bore.*

In 1860 the model proposed by Captain Rodman was adopted for all sea-coast cannon.

The following are the principal dimensions, &c., of the new columbiads:—

Length of bore.....	8-inch, about 14 diameters.	
	10-inch, about 12 diameters.	
	15-inch, about 11 diameters.	
Weight.....	8-inch, 8,500 lbs.	
	10-inch, 15,000 lbs.	
	15-inch, 50,000 lbs.	
Charge—shot and shells.	8-inch, 10 lbs.	
	10-inch, 15 lbs.	
	15-inch, 40 lbs.	

The great disparity in the diameters of the reënforce and muzzle, renders it impracticable to fix an artificial sight to the muzzle; a small projection is therefore cast on the upper side, between the trunnions, as a seat for the front sight.

*Six of the trial pieces (three 8-inch and three 10-inch), made at different foundries, endured successfully upward of 1,000 service rounds. Two 10-inch pieces (one cast hollow and the other cast solid) were 2,500 rounds with solid shot, and 14 lbs. of powder, and 1,632 rounds with 18 lbs. of powder and solid shot. The only injury sustained was the enlargement of the bore by the cutting action of the gas as it passed over the shot. The enlargement of the bore of the solid cast piece was much greater than in the hollow one.

Improvement in the Oxyhydrogen Light.

At the April meeting of the Manchester Literary and Philosophical Society Mr. Alfred Fryer stated that he had recently been making a series of experiments with the oxyhydrogen light, with a view to determine what substance made incandescent produced the greatest amount of light. He operated on various salts of calcium, magnesium, strontium, barium, and also upon some other substances. The best results were obtained from magnesium.—The sulphate of magnesia, when baked, yielded a bright light, but was decomposed by the heat; and the sulphurous acid escaping was very unpleasant. Calcined magnesia succeeded the best of all; but when the powder was used, the gases blew it away. When the powder was mixed with water, and afterward dried, the cake was friable; and when the dry powder was pressed into a mold by means of hydraulic pressure, the cake split up into laminæ when subjected to the gases. After many experiments with the materials in different proportions, it was found that sulphate of lime one part, and calcined magnesia two parts, mixed with water and modeled into a cake and dried, produced the best results. This, however, is not all that could be desired, as in time the cake becomes cracked and fissured by the gas. The illuminating power is to that of lime, pressure and volume of gas being equal, as 54 is to 27. The experiments have been conducted with oxygen and the coal supplied to Manchester. The jet used is a form supplied by Mr. Dancer, a jet of oxygen being surrounded by an annular jet of the coal gas. Mr. Dancer has further improved the jet by allowing the oxygen pipe to project beyond the hydrogen, and by not contracting the aperture of the hydrogen pipe. Mr. Alfred Fryer exhibited the light which he had explained, and the effect produced was very striking.

Preparations are making for what is termed a "World's Horse Fair," to be held in Chicago in September. Premiums to the amount of $25,000 are announced.

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Correspondence

Cost of Steam Power.

MESSRS. EDITORS :—I send you some accounts of the cost of steam power, which are much below the statement of your correspondent, W. R. They are derived from some experiments made by Mr. George Thomson, of Glasgow, Scotland. The experiments were made about the year 1841, on an engine which indicated 70-horse power. Steam was taken from the engine boilers to heat the factory, and to use in the machines for dressing yarn.

	£	s.	d.
Fuel delivered at yard	582	4	6
Tallow	3	9	8
Suet—208 lbs. at 6d	5	4	0
Sperm oil—62 gals. at 7s	21	14	0
Hemp gasket—70 lbs. at 6½d	1	17	11
Fireman—52 weeks, at 13s. per week	33	16	0
Half time of engine keeper, 20s. per week	26	0	0
Mechanics' time—repairs	14	10	4
Total	£688	16	5

For each horse power annually, £9 16s. 9 47-70d.

Mr. John Baynes, of Blackburn, also gives an account of the expense of fuel, for the purpose of furnishing power for and warming three different mills. The mills were kept warm constantly, night and day, without exception, the expense being 2s. 2¾d. for each week, or £5 15s. 11d. annually. The cost of fuel in this case was 6s. per tun of coal, which could be had at prices varying from 5s. 3d. to 7s. 9d. per tun, according to the quantity desired.

Perhaps some of your readers would be interested to know what kind of work, and how much, was done by these engines. The first named—70 horse-power engine was used to drive 64 cords, 24 inches wide, 3 lap machines, 24 drawing heads, 432 fly-frame spindles, and 72 tubes, taking 16-horse power; 2 willows, 1 double scutching machine, 1 spreading machine, 2-horse power, 624 throstle spindles, No. 16 yarn, revolving 2,400 times per minute, 2·3-horse power; 10,200 common-made spindles, No. 36 yarn, 11-horse power; 298 looms, 24-horse power; 14 dressing machines, 2·2-horse power; 18 tape looms, 1·1-horse power. To drive the engine and shafting consumed 10·8-horse power, making a total of 69·4-horse power.

M.

To Set a Belt on a "Quarter Twist."

MESSRS. EDITORS :—Although it is frequently necessary to set a belt on a "quarter twist" or turn, it is remarkable how few mechanics have any established rule by which to do it. The general practice is to shift and try, and keep trying until it comes right. This uncertainty may all be avoided. Every machinist knows that an ordinary straight belt must run squarely on to the pulley. That is, it must run on at right angles with the shaft. If you wish to connect with a belt two horizontal shafts, at right angles with each other, say an engine shaft near the floor, with a line attached to the ceiling, it will require a "quarter turn," and the above principle governing a straight belt must be observed. First, ascertain the central point on the face of each pulley, at the extremity of the horizontal diameter, where the belt will leave the pulley, and then set that point on the driven pulley plumb over the corresponding point on the driver. This will cause the belt to run squarely on to each pulley, and it will leave at an angle, greater or less, according to the size of the pulleys, and their distance from each other. This rule will render the setting of a "quarter twist" as easy and certain as the setting of an ordinary straight belt, a fact which I have verified several times in practice.

V.

Pittsburgh, Pa., May 12, 1862.

Questions for Millers.

MESSRS. EDITORS :—I want to recover a set of reels for a merchant mill and would like to know through your paper how to do it on the most approved plan. Our chest at present consists of 5 reels, 2 superfine and 3 return. The mechanical proportions of these are as follows :—Length of reels 16 feet, diameter 32 inches; the Nos. of cloth are 10 on the 2 superfine reels, No. 11 on 2 return reels, No. 12 on head of last reel and No. 9 on one ⅓ of tailend; and we don't regrind any at present. Now, what I want to know is, what Nos. of cloth to use and in what proportions of Nos. so as not to return any and regrind the middlings. Is 33 revolutions per minute fast enough for the bolts to run and ¼ of inch to the foot fall enough for the bolts? In making the bolting cloths, ought they to be made to fit tight? and is the wide German old anchor brand the best for miller's use? How should the cloth be fixed where it rests on the ribs of the reel? and how shall we do to keep the worms and bugs from eating the cloths up?

Springfield, Clark Co., Ohio. G. W. W.

Practical Information Wanted from Millers.

MESSRS. EDITORS :—I have been well pleased with the practical information called forth by the inquiries of a "Young Miller." All the answers are from men who are engaged in the practical operation of milling, and, therefore, can be relied on as correct in principle, as they form their opinions and ideas from personal observation, and they all agree in the most essential points. The proper draft or dress to be used for this purpose is a matter which involves great difference of opinion among practical millers. The first principle involved in this question is the discharge; next is the way to draft that discharge so that the stone, when grinding, shall receive its proportional quantity on its entire surface, from the eye to the skirt. The difficulty to contend with, in this particular is the variation of circular motion that the grain encounters in passing from the eye to the place of discharge, for in every superficial inch of surface, from the eye to the periphery, the circular motion increases as the circumference grows larger, until the meal is discharged from the stone. From personal experience I have found this the most difficult part of our trade to improve, from the fact that the proper draft in the dress of a millstone is of more importance to millers than is generally supposed by them, and, therefore, I would call on all practical millers to give this matter their attention, as there has been no great improvement in this department of the milling business for the last thirty years.

The milling business occupies a very respectable portion of our national industry, and gives employment to a large investment of capital in all the wheat-growing States of this once happy Union. Though this industry has been greatly disturbed by this wicked rebellion all is working well at the present time, and our farmers are finding a home market for their grain. All of us should give more attention to the business of manufacturing flour than we do, for all of us use more or less of it every day, and it hardly costs us a thought to consider how it is made, or how it could be improved in quality and increased in quantity.

Before closing this I would ask some of your correspondents to give us a few practical remarks on grinding wheat, as that is an important matter.

KING POST.

Brush Valley, Pa., May 20, 1862.

Fire-Proof Safes.

MESSRS. EDITORS :—In your last issue you caution the public against fire-proof safes generally, on the ground that the recent fire in Troy has demonstrated the unreliability of those made at that place. This is hardly just, as all should not be condemned because some kinds fail. Please inform the public that none of Herring's Patent Champion Safes were in that fire, much to our regret, as we feel well satisfied they would have fully sustained the reputation which they have so fairly earned in the great fires that have occurred in New York, Philadelphia and nearly all other of the large cities in the Union.

HERRING & Co.,
Makers of Herring's Patent Champion Safes.
New York, May 28, 1862.

ONCE MORE IN BLOSSOM.—The old Stuyvesant pear tree (175 years old), corner of East Thirteenth street and Third avenue, this city, is again in blossom, and appears more profuse in its blossoms than for years past. The old landmark shows strong symptoms of decay, yet will doubtless last many years to come.

THE MONTYON PRIZE OF 2,500 FRANCS.—The Academy of Sciences, of Paris, has awarded to Messrs. Lallemand, Perrin & Duroy the above prize for their work "On the Action of Alcohol and of Anæsthetics on the System." It was the only prize on medicine and surgery awarded this year.

The New English Iron-Plated Ships of Small Size.

An Englishman, by the name of E. J. Reed, has designed for the British navy an iron-plated ship which can be made of very small size, and which will be a very good sea boat. The London *Times* says that hereafter not even a gunboat will be built wholly of wood for the British navy. We find the following remarks in relation to the new plan in the London *Mechanics' Magazine*:—

We are informed that H. M. S. *Enterprise*, which has been commenced during the present week at Deptford Dockyard under Mr. Reed's superintendence, is the embodiment of an entirely new system of naval construction, and is even a more remarkable vessel than the American *Monitor*, of which the world has lately heard so much. Like the latter vessel, the *Enterprise* has been made extremely strong in the neighborhood of the waterline, and has also an elevated battery of guns standing up above this low shot-proof hull. But unlike the *Monitor*, the *Enterprise* has been provided with upper works, within which ample and healthful accommodation is afforded for officers and men, and by means of which the ship has been made thoroughly seaworthy, so that she may be sent to any part of the world. The armament which the English vessel will carry will likewise be much more powerful than the *Monitor's*, and each gun will have a range of fire greatly exceeding all that has ever before been obtained with ordinary broadside guns, and scarcely inferior to that which the *Monitor's* turret, or Captain Cole's cupola, secures; while all the difficulty and danger that attend the employment of rigged sea-going ships, are got rid of. The system of construction which Mr. Reed, the designer of the *Enterprise*, has developed, is applicable to ships of all sizes and classes, and while it is the first system that has rendered the construction of comparatively small sea-going fleets practicable, it is also the first which has rendered the application of extremely thick and heavy armor to our larger ships possible.

It is said, on good authority, that it is perfectly practicable to build ships upon this system that shall carry armor plates of ten inches, or even a foot thick, and shall at the same time be armed even with the 300-pounder Armstrong guns, if Sir William Armstrong can supply them. In fact, we can see no mechanical limit either to the offensive or defensive powers which may be given, not to our coast-defense vessels only, but even to our sea-going ships, if Mr. Reed's method of applying the armor where it is indispensable, and there alone, be found practicable and fully carried out. As the tendency at present undoubtedly is to increase both the thickness of our armor and the power of our guns, we may consider ourselves fortunate in having had this new system of naval construction produced just at this present crisis, It is no less gratifying to know that the new vessels will cost no more than our old-fashioned wooden vessels, excepting the mere price of the armor plates put upon them.

A JOLLY GOOD FIGHT.—Captain Bailey, who was second in command under Farragut at the battle of New Orleans, was called upon for a dinner speech at the Astor House, a few days since. "Gentlemen," said he, as he nervously twisted his handkerchief into a hard rope and hesitated between his words—"I don't claim any more than my share—we don't any of us—we all want what belongs to us, and no more. Farragut, he did it—he planned it all out; all we had to do was to obey his orders; that's just what we did. As to the particulars, the way it was—was—well, we had a jolly good fight?"

SCARCITY OF FISHERMEN.—So many fishermen have entered the navy that 4,000 green hands are required to man the mackerel fleet soon to go out. The fishermen have been tempted away by the more probable "hauls" of the blockade. Individual cases are given where seamen have made $2,200 or $2,000 apiece in single captures.

THOSE who are not in the neighborhood of bakers and cannot procure the fermentation called yeast, may make a better substitute as follows :—Boil one pound of flour, a quarter of a pound of brown sugar and a little salt, in two gallons of water for an hour. When milk-warm bottle and cork it close, and it will be ready for use in twenty-four hours.

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Saving Manure.

We have received from Charles S. Flint, Esq., Secretary of the Massachusetts Board of Agriculture, his ninth annual report. It is a neat volume of 303 pages, printed by William White, Printer to the State. The report embraces reports of committees on several subjects of most interest and importance to farmers, such as diseases of fruit trees, the cattle disease, &c. From the report of Mr. Grinnell on the wastes of the farm, we make the following extracts :

Of all the wastes upon a farm, perhaps there is none more apparent than that of manures ; none more deserving of reprobation, because none other is so generally and directly prejudicial to success in farming, and none other of any thing like the same extent can be so easily prevented. The farmer, somewhat in imitation of the old orator, speaking under different circumstances, if asked what were the three essentials necessary to success in farming, might reply ; first, manure ; second, manure ; third, manure. It is, indeed, the great motive-power in all agricultural operations, especially in the worn and naturally unfertile soils of New England ; good and clean cultivation is very important, but without a soil containing the elements of growth, it will avail nothing, and these can only be created or kept up by the constant application of manures.

Manures possess different degrees of power, partly from their inherent richness, and partly from the rapidity with which they throw off their fertilizing ingredients to assist the growth of plants. These are given off by solution in water, and in the form of gas, the one as a liquid manure, which, running down into the soil, is absorbed by the fine roots, and the other escaping mostly into the atmosphere to be caught by the ever-breathing leaves, or ascending far up, is again brought back to earth by the descending rain or snow. The great art of saving and manufacturing manure, consists in retaining and applying to the best advantage these soluble and gaseous portions.

By the census of 1860, it appears that there are in the Commonwealth 84,327 barns. The Secretary of the Board of Agriculture estimates the quantity of manure at five cords to each, worth three dollars per cord, making a total of $1,264,905.

If we assume what appears to be liberal, that one-fourth of the barns have cellars, it follows that three-fourths of this manure is exposed to atmospheric and other deteriorating influences. Many competent persons estimate the loss from this cause at one-half, but if it is only one-third, we show a waste from the exposure of the solid manure of $321,635 per annum. But this is not all. When the manure is thrown out exposed, it is nearly impossible to save the liquid portion, which, according to Dr. Dana and the authorities he quotes, is nearly or quite equal to the solid excrements of neat cattle. According to these data then, the loss of the liquid manure would be three-fourths of one-half of the value of the solid, which would be $459,335. There is then an aggregate waste in this State in the matter of manure from barns alone of $780,974, which might and ought to be saved, and when in addition to this is added the loss of other manurial substances, the bones, shells, soap-suds, and other slops from the house, night soil, &c., it is probable that the farmers of this State allow to waste more manure than they use.

Manure depreciates very fast by being suffered to lie in the yard. Professor Voelcker found by accurate experiments, that manure lying in the yard exposed to all weathers, lost in value two-thirds ; only one-third remaining in one year. Manure may be carted and spread directly on the land, if there is any clay or loam in its composition, but the worst possible method is to haul out manure and leave it in small heaps on the field.

Farmers generally are not aware of the value of liquid manure. Johnston and Sprengel, learned agricultural chemists, say that a cow annually voids about 16,300 pounds of urine, which contains 961 pounds of solid matter quite equal in value to Peruvian guano at $60 per tun, making the annual commercial value of the liquid manure of the cow to be $28·83 ; no inconsiderable proportion of her whole value ; a cord of loam saturated with urine, is equal to a cord of the best rotted dung. The manure from the poultry, if they are confined, is as good as guano, and should not be wasted ; that from the house is the most valuable, and if mixed with fresh loam is completely deodorized.

Bones, if thrown into a barrel and covered with ashes and moistened, will, after a while, become decomposed, so as to form, with the ashes, a valuable fertilizer, and well worthy of practice in the making. Hard coal ashes, if screened thoroughly, are worth saving, and hauling a short distance to spread on grass land, containing some lime, and some wood ashes remaining from the kindlings, and charcoal. Wood ashes form one of the most valuable of all fertilizers, and ought to be saved with jealous care, and are, at the common prices, a safer fertilizer than any other to be purchased.

Destruction of Small Birds Causing Alarm.

For several seasons, and particularly the last, there was found to be a scarcity of breadstuffs in France. This state of things caused great alarm, and memorials were presented from some of the departments to the Minister of Agriculture, the Legislative Chamber and the Emperor. An elaborate report has been made on the subject, in which the destruction of small birds is charged with being one of the leading causes of deficient crops. The destruction of small birds has gone on increasing, and in a corresponding ratio has also proceeded the increase of those insects and reptiles which prey on the crops of grain and all kinds of vegetable food ; and on these insect tribes the small birds live. To that degree of alarm has the public mind been brought that inquiry and investigation have been instituted, and have demonstrated the fact that the destruction of the beautiful feathered songsters may, if continued, lead to something like positive famine. This document has been translated and is being circulated in England, to aid in arresting the wanton destruction of birds in that country. It was the subject of a paper recently read before the National History Society of Regate, from which we cut the following :—"Although the sparrows levy a small contribution on the farmer's grain, yet the far greater portion of their food is from injurious insects, and the whole of the food they give to their young is from the tribe of insects. At the beginning of the world man would have succumbed in the unequal struggle if God had not given in the bird a powerful auxiliary—a faithful ally—who wonderfully accomplishes the task which man is incapable of performing—in fact against his enemies of the insect world man would be powerless without the bird."—*Moore's Rural New Yorker.*

Preserving Green Indian Corn.

On the 8th of last April a patent was granted to Isaac Winslow, of Philadelphia, Pa., for a method of preparing green corn so as to preserve it with its natural flavor. We give the following extracts from the specification :—

In my first attempt to preserve indian corn in the green state without drying the same, I did not remove the kernels from the cob. The article thus obtained was very bulky, and when used the peculiar sweetness was lost—the same being absorbed, as I suppose, by the cob.

After a great variety of experiments, I have overcome the difficulty of preserving indian corn in the green state without drying the same, thus retaining the milk and other juices, and the full flavor of fresh green corn until the latter is desired for use. Instead of a hard, insipid, or otherwise unpalatable article, I have finally succeeded in producing an entirely satisfactory article of manufacture, in which my invention consists.

I have employed several methods of treatment of the green corn with results.

I recommend the following method :—Select a superior quality of sweet corn in the green state, and remove the kernels from the cob by means of a curved and gaged knife, or other suitable means ; then pack these kernels in cans, and hermetically seal the latter so as to prevent evaporation under heat or the escape of the aroma of the corn. Now expose these cans of corn to steam, or boiling heat, for about one hour and a half, then puncture the cans and immediately seal the same while hot, and continue the heat for about two hours and a half longer. Afterward the cans may be slowly cooled in a room at the temperature of 70° to 100° Fah.

Indian corn thus packed and treated may be warranted to keep in any climate. Being preserved in its natural state, as near as possible, it retains the peculiar sweetness and flavor of fresh corn right from the growing field. It is only necessary to heat this preserved corn, and season the same, in order to prepare it for the table, as it is fully cooked in the process of preserving.

The Fruit-Tree Borer.

From the Gardener's Monthly.

We recently called on a friend who is famous for the success of his apple crop. He is no believer in the generally received opinions about changes of climate since the days of our forefathers, wearing out of soil, degeneracy of varieties, and the theories that are satisfactory to most people for their ill success, and we asked him for his recipe that we might add it to the number we have already on file. My plan, said he, is simply to keep away the borer. The borer, he continued, weakens trees, and once weakened, the fruit drops before it is mature, or it cannot recover from the slightest injury that any insect inflicts on it ; moreover, the tree becomes sickly, and then insects prey on it ; for they do not like healthy trees. Insects have an office in nature to perform, which is to hasten to decay what nature has intended to remove from living families, just as worms soon take away the life of a sickly pig. Easy enough talking, observed a friend with us, but how do you keep away the borer? Tobacco stems ? No. Lime? No. Ashes? No, none of these. Pray what then! Now you give it up, I will tell you. I merely keep the soil scraped away from the trunk down to the bare roots all the year round—summer and winter. My companion laughed incredulously, if not contemptuously ; and, said he, friend C. I have given you credit for better understanding, than to suppose any amount of freezing or roasting will kill a borer once domiciled within the trunk of the tree. I do not suppose it will, he replied, I have no such object. If I can ever find one in, I trust to my jacknife or wire for his destruction, and not to heat or frost. This was a poser. What then is your object? was the next inquiry. It is to keep the borer out. Did you ever see the borer enter in the stem of the tree, at any hight above the ground? No. And why? It requiries soft moist bark for the purpose ; and whenever you remove the soil and render the bark hard and firm to the collar, the borer instinctively goes to other more favorable places for the secure rising of its young. But will they not go into the main leading roots ? I have found them to avoid these roots as if they were unfit to rear their young ; in fact I have never known them attack mine.

Nor had they, that was evident. A clean, healthful orchard—never cropped, annually top dressed, grass kept away several feet from the stem, so that no insect could find a cool and moist harbor for its larvæ, and every success following. Certainly the borers did not attack these trees ; and the novel reasoning struck us as so philosophical that we have thought it worth recording in our pages, for further observation, and—for we want to be repaid for the suggestion—report in these pages.

Grafting the Grape Vine.

We have met with many experienced persons who have never seen the grape vine grafted. The process is so easy, that thousands who are anxious to possess the new varieties, should especially take care of their old roots and insert scions of the new. No clay or covering of the grafted part is necessary, beyond the natural soil, below which the graft is to be inserted. Saw off your stalk and put in your scion with two or three buds, wedge fashion, as in the cleft-grafting of fruit trees, and then cover up a few inches, leaving one or two buds above the ground ; where the stalk is very large, and convenient to split, a gimlet-hole so made as to bring the two barks together answers. The sprouts of the old stalk, as they spring up to rob the graft, must be pulled off. Grafts often bear some fine clusters the first season of growth, and many more the second. In this way the old stalk of wild grapes removed from the woods, are very useful with due care. We have lately seen an old Catawaba vine that was wanted for shade forty feet off, laid down for one year till it had rooted well, and then was grafted with perfect success, and fruited the first year.—*Horticulturist.*

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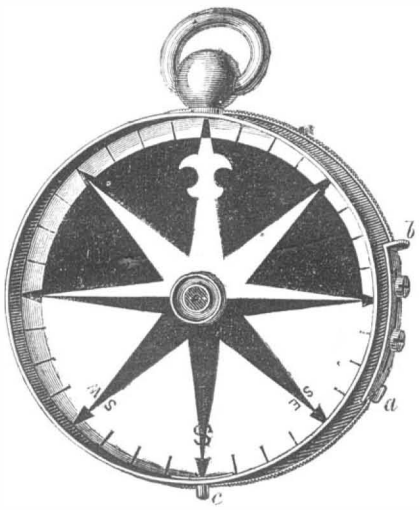
HUNTER'S ARMY AND TRAVELERS' COMPASS.

The accompanying engraving represents a pocket compass with a floating card of mother of pearl, one of which is stained black with the exception of the star lines, which are white on the black and black on the white section. The object of thus making the card is to enable the compass to be used at night as well as by day, by military parties and travelers. The highly reflecting qualities of the white mother of pearl and the strongly contrasting surfaces of the north and south sections of the card enable the points to be read off with facility.

Ship compasses are formed with floating paper cards. The magnetic needle is cemented on the underside of the card, and it is pivoted at the center upon a vertical point. The needle is thin and flat bushed at the center usually with a ruby. A ship's compass card is not made with strongly contrasting north and south surfaces, therefore a light is required to read it at night. Pocket and surveyors' compasses have hitherto been made without floating cards. The card is either fixed on the bottom of the case or the index is painted on it, and the needle exposed. Such pocket compasses cannot be used at night without much inconvenience. To permit this new compass to be



carried in the pocket, and prevent undue wear of the setting, the card is raised off the vertical pivot when not used, by a small arm, which is bifurcated at the center, under the card, and its nib, *a*, extends to the outside of the case. The slide, *b*, when pushed to the one side, acts on an inclined plane, and presses down the nib, *a*, raising the card from its pivot. In using this compass the slide, *b*, is pushed to the right and the nib, *a*, released; the card then drops on its pivot; the needle vibrates for a short period, when it settles at a point north and south. In taking an observation the card is held steady by a catch plate, which is operated by pressing with the finger on the nib, *c*. Major Myer, signal officer in the army, has used one of them, and says respecting it:—"I find that it can be read much more easily at night than any other compass I have seen." This claim is for the floating card formed with strongly contrasting surfaces, thus rendering it a night as well as a day compass, as described.

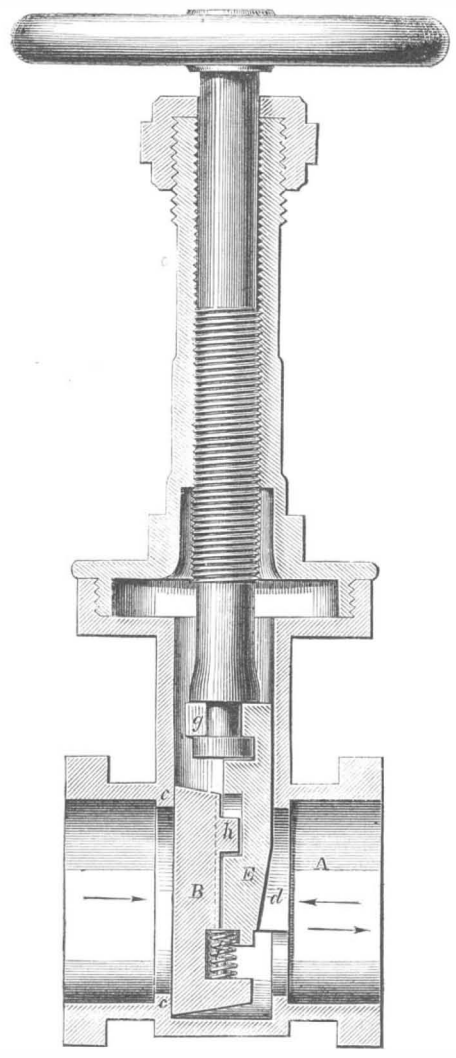
Patented May 6, 1862, by H. W. Hunter, optical and philosophical instrument maker, 169 William street, this city.

Wrought-Iron Rifled Cannon.

We understand that between 300 and 400 wrought-iron rifled cannon have been supplied to the government by the Phenix Iron Co., Phenixville, Pa., made under the patent of J. J. Griffin, the superintendent of the works. The peculiarity of this process consists in the manner of making the fagot or pile, and in rolling it into gun blocks between cylindrical rollers. By this mode the evils, affecting the quality of the iron, encountered in the old method of forging large masses of iron, are entirely avoided. When finished, the fibers of the iron are found lying around the longitudinal bars which form the bore of the gun, thus insuring the greatest possible resistance, of which the metal is capable, to the force of the powder on the discharge of the piece. It is in reality a Stub and Twist cannon, possessing the strength and endurance of the Stub and Twist fowling piece. The 3-inch guns adopted by the government weigh about 820 lbs. each, and take a shell of 10 to 12 lbs. The vents, in order to protect the iron from the deteriorating action of the ignited powder, are bushed with hammered copper. According to tests made at Fortress Monroe, the endurance of Griffin's gun was found to be greater than that of the bronze pieces.

LUDLOW'S SLIDING STOP VALVE.

The accompanying engravings represent a sliding valve in which there is no friction between the valve and its seat, and which closes the pipe perfectly tight. This is effected by forcing a wedge behind the valve to press it firmly against its seat; the wedge being loosened before the valve is withdrawn.



A vertical section of the apparatus is shown in Fig. 1. A is the pipe through which the water flows from left to right as indicated by the arrows. B is the valve, ground to fit its face, *c c*. The rear of the valve box is formed with two wedge-shaped projections, *d d*, shown clearly in perspective in Fig. 2.

Fig. 2

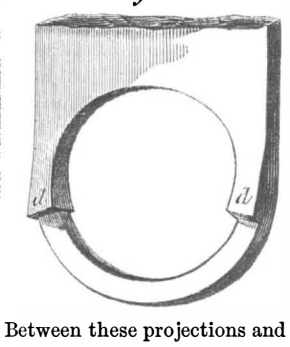
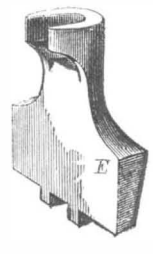


Fig. 3



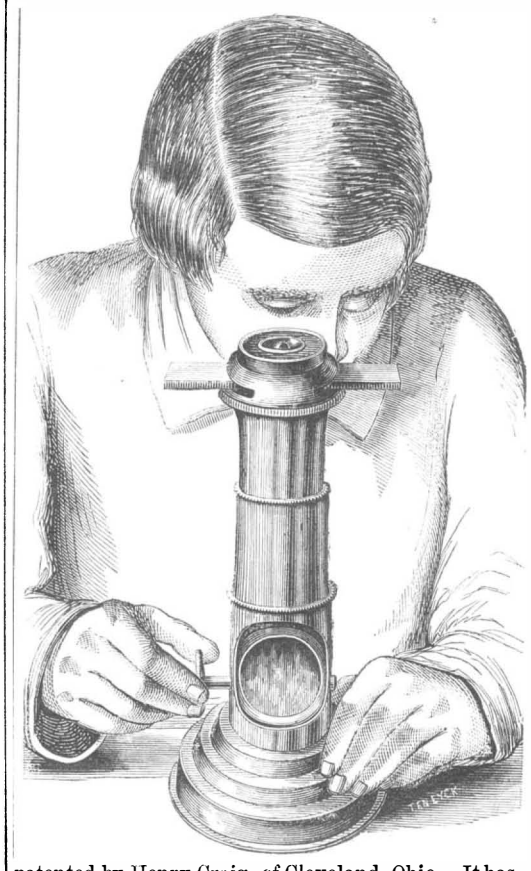
Between these projections and the valve is the wedge, E, represented in perspective in Fig. 3. This wedge terminates at its upper end in part of a ring, or jaws for seizing the lower end of the valve stem by a recess, *g*, as shown in Fig. 1. The valve stem raises and lowers the wedge, and through this means only acts upon the valve. Upon the back of the valve is formed a lug, *h*, which enters an elongated recess in the wedge, and by this arrangement the wedge is permitted to move upward a certain distance before it begins to raise the valve. This loosens the wedge and allows the valve to fall back a little from its seat before it begins to move, thus preventing any friction between the valve and its seat. In closing the valve, as the wedge, E, is lowered, the valve, B, falls into place by its own gravity, when, the continued descent of the wedge, causing it to enter between the valve and the projections, *d d*, will press the valve against its seat, and close the passage.

To make sure of the descent of the valve into its place, a spring, *i*, is introduced beneath the lower end of the wedge, to press the valve downward. This spring is absolutely necessary when the valve closes upward, and the inventor prefers to employ it in all cases.

The patent for this invention was granted through the Scientific American Patent Agency, September 17, 1861, and further information in relation to it may be obtained by addressing the inventor, H. G. Ludlow, 2d, at Waterford, N. Y.

THE CRAIG MICROSCOPE.

The annexed engraving represents a microscope



patented by Henry Craig, of Cleveland, Ohio. It has but one lens, and therefore requires no adjustment of focus. The lens is mounted in an india-rubber disk, at the upper end of a brass tube, and the tube is provided with a mirror hung in an opening near its lower end to reflect the light upward through its axis. It is also divided by a perforated diaphragm with a small hole through the center to prevent the interference of straggling rays. A slit is made through the tube just below the lens for the insertion of the object slides.

These microscopes render the blood and milk globules, as well as some of the animalcules of stagnant water, visible, and they are sold for $2 each, or sent by mail for $2 25.

The patent for this invention was granted Feb. 18, 1862, and further information in relation to it may be obtained by addressing Henry Craig, at Cleveland, Ohio, or at 182 Centre street, New York.

M. Genin lately addressed the Academie des Sciences on the subject of "the Sex of Eggs." He affirms that he is now able, after having studied the subject for upward of three years, to state with assurance that all eggs containing the germ of males have wrinkles on ther smaller ends, while female eggs are smooth at the extremities.

Van Dewater's Water Wheel.—Since publishing the engraving of Van Dewater's water wheel in our issue of April 12, Mr. Van Dewater has changed his residence to Conquest, Cayuga Co., N. Y., to which latter place he would like his letters addressed.

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VOL. VI. NO. 23.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, JUNE 7, 1862.

TORPEDOES TO DESTROY VESSELS.

Cannot a torpedo be invented that will blow to pieces any vessel in the world? is a question which is asked us more frequently perhaps than any other, and we believe that it will yet be answered in the affirmative. We are well aware that the efforts in this line have been ridiculous failures—even the latest and most ingenious devised by the rebels in this war—but the failures have always been owing to two causes, neither of which would appear very difficult to overcome.

One cause of failure—the most frequent in this war—is the powder in the apparatus getting accidentally moistened, generally from want of thoroughness in the workmanship. There certainly can be no difficulty in guarding against this occurrence. The powder might be inclosed in a copper vessel, with a small part made thin enough to explode a cap inside by striking the copper upon the outside.

The principal difficulty has been, however, to place the torpedo against the vessel's side or bottom, and it would seem that this might be overcome by invulnerable vessels like the *Monitor*, constructed to run with great speed. Supposing a mast were attached to the bottom of the *Monitor* or of the Steven's battery, so as to project forward 100 feet, and a copper cone holding a barrel or a hogshead of gunpowder was secured to the end of the mast, and a proper lock for discharging was connected with lines leading on board, would not the vessel be able to blow up anything that she could overtake? This plan is but one among scores that have been suggested to us, and we select it as a specimen not for its superiority, but because we are free to publish it. The apparent practicability of many of these plans has suggested the above remarks, and even if they are all defective our inventors could doubtless soon overcome the defects.

If the officers of the army and navy did not exclude from trial nearly everything but their own inventions—if government would make provision for giving decent attention to the rational plans of our ingenious citizens, we are satisfied that our seaboard cities could soon bid defiance to the mail-clad navies of the world.

GREASE AND INDIA RUBBER.

If some means could be found to prevent the action of grease on india rubber, the discovery would be hardly less valuable than that of the vulcanizing process. When india rubber is dissolved in any volatile liquid, such as spirits of turpentine or benzole, the solvent may be expelled by heat, but when it is dissolved in any of the animal or vegetable oils there is no method known by which it may be separated. India rubber is soluble in all the fatty oils, and this property interferes with its use in many places where it would be otherwise exceedingly valuable; for instance, fishermen would wear india rubber overalls in preference to any other material, were it not for the fact that they are soon ruined by the oil of the fish; and india rubber belts have been frequently brought into discredit by the circumstance of a few being injured by their careless exposure to the contact of grease.

We do not regard this field as very promising, for it has been explored by many learned chemists, and it seems to be the nature of india rubber, in all combinations and under all circumstances, to yield to the solvent power of fat; still, in organic chemistry there is no known limit to the variety of combinations and of results.

A GOOD MOVE IN LIFE INSURANCE.

Of all the institutions which are the product of modern civilization, there is none more purely beneficent than life insurance. It enables a man, by devoting a fraction of his income to the purpose, to make immediate provision for the support of his family in case of his death. The life insurance company says to a young man, pay us $25 a year, and we will give you a bond to pay your wife $1,000 immediately after your death, whenever that may occur. Older persons wishing to be insured for the same amount have larger annual payments to make, but the annual premium which a person commences to pay is not augmented as he advances in age. This arrangement is designed especially for men with families.

There is another system calculated for bachelors, or any persons without families, who have some property which they wish to enjoy the full benefit of during their lives, but which they do not wish to leave to any one else. The bachelor gives his money to the company, and they agree to pay him a certain amount annually as long as he lives; the principal then to belong to the company. As they do not have to pay back the principal, they can afford to pay more than the usual interest on the amount thus invested each year, and thus the man gets a larger income than he would by any ordinary loan. This form of investment is called purchasing an annuity.

The Mutual Life Insurance Company of New York have recently adopted the plan of combining life insurance with the sale of annuities, in cases where the parties desire it. They say to a man who applies to have his life insured for $1,000, we will pay this $1,000 to your wife in case of your death, or we will pay her every year as long as she lives a certain sum larger than the interest that she could obtain by investing the same amount in any other way.

In this case the children might not be as well provided for in the event of the death of both of parents, as they would in case the whole capital was received from the company at the death of the father, but the widow would receive a larger income during her life.

By reasonable care in making inquiries, there is no difficulty in selecting responsible companies in which to effect insurance on one's life, and every man who has a family can, if he pleases, avail himself of this means of making sure that they shall not come to want. In case of sickness or loss of employment, a portion of the money paid to the company in premiums can be withdrawn, and in many ways life insurance institutions are a great blessing to a large portion of the public, and we counsel persons in all conditions of life to avail themselves of the advantages that are likely to arise by investing in some of the various schemes offered by most good companies. The old wealthy institutions of this kind are usually the safest to purchase policies of.

AMERICANS AT THE GREAT ENGLISH EXHIBITION.

At the great exhibition in London, in 1851, the Americans made a very sorry show, and at the present one they will make a poorer appearance still. This has been to some people a source of national mortification, but it ought not to produce such an emotion. The principal inducement for exhibitors to incur the great labor and expense of taking articles to these fairs, is the notoriety which they obtain; thus securing a market for their wares. The fairs are used as costly but very effective advertisements.

Now, our manufacturers are aware that the purchasers for their goods are not to be found in Europe, and they are naturally indisposed to expend large sums in order to display their merchandise before people who will not buy, however much they may admire. The commodities that we sell to Europeans are almost exclusively raw materials: cotton, tobacco, wheat, &c., and though these are shipped in enormous quantities, samples of them appear insignificant in a vast palace crowded with the countless articles of necessity and luxury of many civilized nations.

The few products of our manufactures which find purchasers in Europe—revolving pistols, sewing machines, &c.—are very prominently and fully exhibited at the world's fair in London, but the great majority of our manufacturers, whose articles are made exclusively for the domestic market, very wisely expend the money which they devote to advertising in a manner to attract the attention of those who may become the purchasers of their wares.

REVOLVING TURRETS FOR BARBETTE GUNS.

Why should not the guns which are now mounted in the open air upon the tops of our forts be placed in revolving iron turrets? We can conceive of no better plan for mounting such a turret than that which is adopted for the dome of the Cambridge telescope. Form a groove in the lower edge of the turret, and a corresponding groove in the bed below, and place a sufficient number of turned cannon balls in the groove to support the structure. Then secure a geared ring around the turret, and let it mesh into a worm screw provided with convenient crank, and one man would be able to turn the structure easily by hand. If a telescope was arranged as in the turret upon the *Monitor*, the guns could be kept constantly pointing at a passing ship, and if the proper elevation of the piece had been previously ascertained by trial, there would be no difficult in hitting a vessel within reasonable range at every shot.

The embrasures could be made merely wide enough to allow the guns to be run out, and the barbette gunners would be safer than those under the casemates. The roof would be made conical, and on the sides toward the interior of the fort, they might be formed of open lattice work so as to secure perfect ventilation. On this side security might be provided against the admission of fragments of shells by placing one series of bars below the spaces in the upper series, so as to make the passages crooked.

Is not this idea worthy of the consideration of our military engineers?

PRINTING IN COLORS.

The discussion of this subject at the Polytechnic Association, a report of which we publish on another page, was unusually interesting. Mr. J. E. Gavitt, who gave an account of printing bank notes in colors, is a man well known in the ranks of science. He was formerly of Albany, and visited Europe to purchase the instruments for the Dudley Observatory. He is now connected with the American Bank Note Company. The prints from nature were mentioned in the SCIENTIFIC AMERICAN at the time when they were received. The process embosses the paper besides coloring it, and it is difficult to distinguish the prints from pressed leaves and flowers. We remarked especially a bunch of seaweed, in which the involved crossings of the fibres were reproduced with a minute fidelity which would never be attempted by an engraver.

AN INDIA RUBBER OMNIBUS!—A Connecticut cotemporary states that an ingenious Yankee (what Yankee is not ingenious?) has invented an india rubber omnibus which, when "jam full," will hold a couple more. The inventor has not yet secured his marvelous machine through our Patent Agency, but as soon as he does so we shall hasten to interest our readers by describing his invention in our columns.

A CIRCULAR from the Patent Office says the results of the cultivation of sorghum the past year settles the question of its practical success. The value of its product is now counted by millions. One of the difficulties is the want of pure seed. To meet this want the Patent Office has ordered seed from France for distribution the present spring.

DISCOVERY OF COAL OIL IN CALIFORNIA.—The *Mining and Scientific Press* of San Francisco says that about twelve miles from Oakland a coal-oil bed has been discovered, from which large supplies can be derived for burning purposes.

FOR NEW ORLEANS.—It is estimated that over five hundred vessels will sail for the southern ports by the first of June. There will be at least two hundred clearances for cargoes of ice.

A NUMBER of choice horses and sheep have been shipped from Boston within the last week, to the order of parties in Australia.

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RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list on another page :—

Veneer Cutter.—This invention consists in suspending the table or platform which carries the logs from two or more pivots inserted in disks or arms attached to the ends of rotary shafts in such a manner that by imparting to said shafts a rotary or oscillating motion, the log carrier receives a compound motion around the centers of said shafts and in a direction parallel to a line drawn through said centers, whereby the operation of cutting is considerably facilitated. Invented by John Sperry, of New York city.

Cork-Cutting Machine.—The object of this invention, by John Power, of Boston, Mass., and A. J. Bailey, of Charlestown, Mass., is to obtain a machine by which cork stoppers for bottles and other vessels may be cut with a single knife at one operation. To this end, the invention consists in the employment or use of a reciprocating knife, in connection with a rotary mandrel, arranged in snch a manner that the mandrel will have a continuous rotary motion, in one and the same direction, imparted to it by the reciprocating movement of the knife, and the latter, during its movement, be automatically adjusted so as to rough off the cork during its movement in one direction, and to give the finishing cut during the other movement in the opposite direction.

Photographic Album.—The object of this invention is to adapt metallic mats to the leaves of photographic albums, and to this end it consists in securing such a mat in place by providing it with a flanch which is interposed between the outer sheet of card board or other material which forms either surface of the leaf and the middle or back piece or body of the leaf, and held in place by the union of the said outer sheet with the said middle or back piece or body. E. D. Griggs, of Waterbury, Conn., inventor.,

Photographic Apparatus.—This invention consists in a certain arrangement of moveable supplementary lips or flaps attached and fitted to the lid of a trunk or box, whereby the said trunk or box may be converted expeditiously into a "dark room" of about double its size. It also consists in a certain combination of a vessel for containing developing solution, and a fountain or vessel of water, and a certain system of valves in connection therewith, whereby the flowing of the said solution over the plate and of the water for washing of the said solution are controled by the hand of the operator outside of the "dark room," and the said solution and water are caused to be delivered on to the picture by the same tube or conductor, so that the water may wash away all trace of the solution from the said conductor after the developing of a picture, and so prevent the staining of the next picture. Patented by N. F. English, of Hartland, Vt.

Brick Machine.—This invention, patented by John J. Alvord, of Tecumseh, Mich., consists in a novel and improved clay-tempering device, rotary mold wheel and screw feeder, so constructed and arranged that the whole process of molding and pressing bricks is performed by mechanism having a rotary motion, the working parts being so arranged as to admit of a quick movement without the liability of getting out of order or becoming deranged in any way.

Steam for Locomotive Boilers.

[From the London Engineer.]

With regard to the material of locomotive boilers, there is an increasing disposition to employ steel instead of iron. Under the name of homogeneous metal, Messrs. Shortridge, Howell, and Co.'s mild steel has been for some time successfully used in firebox plates on the Scottish Central Railway, and Messrs. Cammell and Co.'s steel has been similarly used, for a long time, for fireboxes on the Great Western Railway of Canada. On the last named line two boilers for heavy freight engines have been made throughout of the same steel, and have been in constant and satisfactory use for upward of fifteen months. Indeed, with steel of a very mild quality, or, in other words, a steel containing only a very small amount of carbon, no possible difficulty could be apprehended, for not only is such steel as tough as copper, but it is as workable in the fire as the best iron, whether the object be flanging or welding. Neither, we believe, has boiler steel caused any trouble in the case of locomotives by reason of any expansion peculiar to itself, or in any way different from the ordinary expansion of boiler iron. When the steel boilers of the steam vessel *John Penn* were removed, it was said that their failure was owing to the excessive expansion of the steel. This was most improbable in itself, for the expansion of steel is not known to vary to any extent from that of wrought iron. It was more likely that an unsuitable quality of steel was used, perhaps puddled steel, or, at any rate, a variety containing too much carbon, and, for that reason, brittle. The very largest class of land boilers—worked, too, at 100 lb. pressure per square inch—are now made from Bessemer steel, and nothing is heard of any difficulty in the way of expansion. For fireboxes especially, we believe the mild steel plates, which are now furnished by the best makers at a price below the average of the various prices for Lowmoor iron plates, will be found even better than copper, offering greater endurance with much less weight, and at less than one-sixth of the first cost, when the difference of thickness is taken into account. For tubes, too, there is no reason, that we know of, why steel should not entirely supersede brass, especially as ordinary Staffordshire iron tubes have been already found to answer a good purpose in coal-burning engines.

The whole saving of weight by the adoption of steel for locomotive boilers of the largest class should be between one and two tuns, the cost of moving which in an express engine, is not under 1½d. per mile run, or nearly £200 a year for its ordinary mileage. The whole saving of weight, however, cannot be realized while riveted joints are retained, the strength of which is hardly more than one-half that of the whole plate. For large boilers many makers already employ double-riveted joints, the strength of which is believed to be one-fourth greater than that of single-riveted joints. So, too, plates with thickened edges are used to some extent, as in Messrs. Fairbairn & Sons' engine in the Exhibition. But welded joints are the only means of preserving the full strength of the material, and we do not doubt that boilers welded upon Mr. Bertram's plan will be found the strongest. Locomotive boilers indeed have occasionally been made with the longitudinal seams welded up solid, and we observe that some of the Sheffield steel makers are now making lap welded tubes of mild steel up to a diameter of 3 feet. Presuming that, as these can be made of a diameter of 3 feet, they can be made of any size, they seem to offer an excellent material for the barrel of locomotive boilers, and we shall be glad to hear of their practical adoption. Krupp, meanwhile, is preparing to roll steel of a width of 15 feet., so that a locomotive boiler barrel of the very largest size can be rolled up and welded whole from a single plate.

Why the Parrott Gun on Board the Naugatuck Burst.

Capt. D. C. Constable, of the *Naugatuck*, has written a private letter to Capt. Faunce, from which we make the following extracts :—

We opened fire upon the battery with our heavy gun, and threw shell and canister from our broadside ones into the woods. Our station was abreast of their rifle-pits, and was only forty feet from the shore, so that their sharp-shooters had a fair chance at us. During the fight, and while our heavy gun was performing splendidly it burst; but fortunately disabled but one man. It burst from the vent to the trunnions in two halves, throwing one half overboard on the port side, while the other half was landed on deck on the starboard side. The muzzle forward of the trunnions remained entire, and was thrown forward about two feet. The gun-carriage was destroyed, the pilot-house shattered, part of the upper deck crushed in, and some of the main deck beams started. How, I escaped, God only knows. I was within two feet of the gun when it burst, having just sighted and trained it upon the battery. My speaking trumpet is completely crushed, and a fragment of the gun, weighing about 1,500 weight, fell so close to me that it tore my coat. I was hit on the head by some part of the gun or carriage (I think it was one of the large rubbers), which stunned me for a moment, although I was able to keep the deck and superintend the fighting of our broadside guns (which were well handled under charge of Wilson), until the squadron fell back for want of ammunition, about an hour and a half after our gun burst. After heaving up our anchor I fainted away; but after being cupped behind the ears by the surgeon of the *Aroostook*, who came on board to look out for our wounded, I was able to resume the charge of the deck.

The *Stevens* did not haul off until the *Galena* and *Monitor* set her the example. The *Aroostook* and *Port Royal* dropped down half an hour before we hove up. The *Aroostook* hove up, but the *Port Royal* slipped her moorings. Since I have been in command of the *Stevens*, I have always observed the precaution of having a man on deck to "feel home" the shot or shell after the muzzle of the gun is elevated, for fear that the shot or shell might start while the muzzle is depressed in the berth-deck. At the time the gun burst, this precaution was attended to under my own eye, consequently the bursting could not have been caused by the shot not being "home." In making my report to the Commodore after the action, I requested him to appoint a board of officers to examine into the cause of the bursting. The Board so appointed examined the gun, &c., and report that they find an old flaw extending from the inside of the vent to near the outside surface of the gun, and that, therefore, they consider that the bursting was caused by the gun heretofore having been subjected to severe and protracted tests, &c., and fully clearing me from any want of attention or neglect. This I am glad of.

The iron gun on board of the *Naugatuck*, was mounted amidships, pointing toward the bow, and was loaded from below by depressing the muzzle, which was effected by means of pulleys ingeniously constructed for that purpose. The gun was loaded by means of a moveable charger, which could be raised or lowered at pleasure. The ramming was accomplished by a sort of piston rod on a line with the muzzle of the gun, which is also worked by pulleys, thus affording the celerity of loading and firing every half minute. The gun was capable of throwing a hundred pound shot.

Strange Spontaneous Combustion.

The Woodstock (C. W.) *Times* reports a remarkable spontaneous combustion which occurred recently in that place. It appears that at the close of the day's business operations, the practice of the parties in whose premises the case happened, has been to rub the counter with linseed oil, leaving the oil to penetrate the wood during the night, to be cleaned off in the morning. This is done with cotton rags, formed into a ball secured tightly. In the present instance, the rags or balls of cotton cloth after use were left on the end of the counter, unconnected with any substance that would readily take fire, and the only mischief that resulted was the disfigurement of a portion of the counter. But one of the two balls ignited. The inference is that the one that burned was rather more tightly tied. Had the premises been consumed, the origin of the fire would forever have remained a mystery. From this occurrence a lesson may be gathered, namely, that rags saturated with linseed or in fact with coal oil, and allowed to remain in a compact condition, are liable to take fire. The rags in the case under notice had not been long in use, and, with the exception of the oil, were free from any other substance.—*American Railway Review.*

Most animal and vegetable oils have a strong affinity for oxygen, and when their surfaces are sufficiently extended they will absorb it so rapidly as to take fire. But coal oils have no affinity for oxygen, and will not absorb it, hence they are not liable to take fire by spontaneous combustion. This property adapts these oils to preserving metal from rust, and to many other uses.

Recent Improvements in Lucifer Matches.

The London *Chemical News* says that of matches prepared with ordinary phosphorus, and which consequently ignite readily upon any friction surface, the "Patent Paraffine Matches" of Messrs. Letchford & Co. are particularly good examples. Instead of the objectionable sulphur coating, melted paraffine is used for impregnating the wood and rendering it more inflammable. Such matches are not likely, therefore, to play havoc with the silver candlesticks and bright metallic surfaces often brought near them in actual service. Their power of remaining uninjured by damp is a special character for which this kind of match is remarkable; in a comparative examination of several different sorts, these only were capable of being ignited after six hours' exposure to a moist atmosphere. On this account they would be particularly suitable for export, and little affected by climate.

THE Portland Company lately shipped to New York a number of iron cars (amounting to about 30 tuns in weight), destined for the Panama Railroad. This company built about all the locomotives for that road, and they have given great satisfaction.

MESSRS. Dunham, Kellogg and Ives, of Hartford, Conn., are cultivating trout on a large scale in a pond in Glastenbury. They have nearly 50,000 of a stock, and when the number reaches half a million the proprietors expect to net $12,500 per annum from them.

DUMPLINGS.—In boiling dumplings, or any kind of paste, the cover should never be removed nor the water allowed to cease boiling until the paste is done; when it should be taken off before it becomes soaked and heavy.

THE Philadelphia *North American* says that shipbuilders in that city never enjoyed more prosperous times. The shipyards are as busy as well patronized tailors' shops on Saturday night.

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Spontaneous Generation.

[Continued from page 343.]

The following account of the researches of Pasteur, respecting the theory of spontaneous generation, was translated and condensed for the *American Journal of Science and Art*, by M. C. White, M. D.:—

FERMENTATION OF URINE.

A flask with an attenuated neck was one-third filled with fresh urine and boiled for three or four minutes and then allowed to cool, with no access of air except what was drawn through a platinum tube heated to redness. When cool, the flask was hermetically sealed, and the inclosed urine was thus exposed only to atmospheric air, deprived by heat of all viable germs. In this condition the urine remained for months without change. Into a flask thus prepared, asbestos charged with atmospheric dust was introduced by the method above described. The flask was kept at 86° Fah., and in about six hours mucedines and infusoria appeared, among which were *bacteria*, *vibriones*, and *monads*, the same as appeared in similar urine exposed to the open air. During the following days lithates and crystals of triple phosphate were deposited, the urine became ammoniacal, and its urea disappeared under the influence of the true ferment of the urine, which Pasteur believes to be organized, and whose germ could only have been introduced in the atmospheric dust in connection with the germs of infusoria and mucedines. When a flask prepared in the same manner had only calcined asbestos introduced, without atmospheric dust, neither mucedines nor infusoria appeared, neither did any fermentation take place, however long the flask was permitted to remain unopened.

COAGULATION OF MILK.

Fresh milk was boiled in a flask for two or three minutes only, and after being allowed to cool with access of calcined air, as in the preceding experiments, it was hermetically sealed. In eight or ten days the milk was coagulated, but when opened it was found remarkably different from milk coagulated in the open air, for it remained alkaline as fresh milk; but the milk was filled with infusoria, most frequently vibrios about $\frac{1}{500}$th of an inch in length, yet no vegetable productions were detected.

The common theory that milk coagulates in consequence of the formation of lactic acid is an error. It is also shown that vibrios may appear in milk which has undergone ebullition for several minutes at 212° Fah., although urine or a solution of sugar and albumen does not produce vibrios under such conditions. In other experiments the milk was boiled for longer periods under a pressure of 1½ atmospheres at a temperature of 230° or 235° Fah., and the flasks were sealed as before. Flasks thus prepared furnished no infusoria; the milk did not coagulate, however long it remained inclosed in the flasks; it remained alkaline even with the presence of oxygen in the form of calcined air, as stated above; and it preserved apparently all the properties of fresh milk.

Into flasks of milk thus prepared, Pasteur introduced atmospheric dust by the method detailed above, when the milk coagulated, and both animal and vegetable productions appeared as in the milk exposed to the open air. The generally admitted theory of ferments which had of late years received fresh support from the writings of chemists, now appears more and more at variance with the results of experiments. The ferment is not a dead substance without determinate specific properties. It is a being whose germ is derived from the air. It is not an albuminous substance altered by oxygen. The presence of albuminous matters is an indispensable condition of all fermentation, because the "ferment" depends upon them for its life. They are indispensable in the light of an aliment to the ferment. The contact of the atmospheric air is, primarily, equally an indispensable condition of fermentation; but it is indispensable only as being a vehicle for the "germs" of the "ferments."

There are many distinct organized ferments which excite chemical transformations, varying according to the nature and organization of the ferment.

To confute various objections made by advocates of spontaneous generation, Pasteur undertook to determine the relative abundance of organic germs in different localities. A series of flasks were all one-third filled with the same putrescible fluid—a solution of sugar and albumen was employed in most of the experiments. The fluid was then boiled for two or three minutes in the flasks, and the neck of each flask was drawn out to a fine point, and hermetically sealed while the fluid was hot. These flasks were then taken to different localities, and the points of the necks were broken, and the air of the several localities allowed to rush in and fill the flasks. This violent ingress of air carried in, of course, all the dust held in suspension, and all other principles known or unknown associated with it. In this condition each flask was again hermetically sealed, and the whole placed where they were kept at a uniform temperature of 80° to 85° Fah.—a temperature known to be the most favorable for the development of animalcules and mucors. The results of these experiments were not what the principles generally admitted would lead us to expect, but they were perfectly consistent with the theory of the diffusion of germs.

Generally in three or four days the liquid in the flasks was found altered, but in flasks placed in identical conditions were found very different organisms—much more varied so far as mucedines and torulas were concerned than if the liquids had been freely exposed to ordinary air. On the other hand, it frequently happened in a series of experiments that several of the flasks remained absolutely unaffected for an indefinite time, as if it had received only calcined air.

This simple and unobjectionable method of experimenting appears to demonstrate that the cause of so-called spontaneous generation does not exist in the ambient air throughout its whole extent, but that it is possible to take up in a single place and at a given instant a considerable volume of ordinary air which, without having undergone any physical or chemical change, is altogether unsuitable to give origin to infusoria or mucedines in a liquid which is invariably thus altered when it is exposed to the open air. The partial success of these experiments shows that by these movements of the atmosphere there is always brought to the surface of a putrescible liquid in an open vessel a quantity of air sufficient to furnish germs suitable to be developed in two or three days.

It appears that the organic productions in the flasks are more various than if the contact with the air had been free, *i. e.*, the organisms in the several flasks are different. This result might have been expected, for by limiting the rush of air and repeating it with different flasks, a small number of germs would be collected in a limited portion of air, and the growth of these germs would not be obstructed by other germs, more numerous or more vigorous or rapid in their growth, capable of monopolizing the soil to the exclusion of those less vigorous or less rapid in growth.

[To be continued.]

Practical Value of Scientific Knowledge.

The *Westminster Review* says:—

Some years ago, it was the practice of tin-plate works to throw away a large quantity of black dust formed in the manufacture. In conjunction with the late Mr. Henry, Dr. Percy visited tin-plate works in South Wales, and procured specimens of this dust, which it had been the former custom to throw into the river hard by, and in which Mr. Henry found 60 per cent of tin! Many copper ores contain considerable quantities of gold and silver, which it has not been considered worth while to separate. At some large chemical works, in which sulphate of copper was prepared by dissolving copper in sulphuric acid, an insoluble residue was produced in the process, which had been put aside from time to time, and had fortunately not been thrown away. A small sum was offered by certain persons for this residue; and suspicion having been excited by the quarter from which the offer proceeded, it was declined, and the residue was examined, with the result of finding it to contain £700 worth of gold! It is believed by Dr. Percy that the slags which have been cast out from the furnaces used for the remelting of old copper and the refining of new in the government establishments for the preparation of copper sheathing for ships' bottoms, contain a large amount of the precious metals. There are probably, he states, accumulations of copper slags in some of H. M.'s dockyards, or in their vicinity, which present a more promising field for mining enterprise than many a *sett* in Cornwall or Devon.

Gigantic Canals in India.

We take the following from the *Mechanics' Magazine*:

From Calcutta we learn that, in anticipation of the future extensive cultivation of cotton in British India, it is intended to form a number of canals for the irrigation of the districts adapted to the growth of the plant. The general scheme proposed by Colonel Dickens, under the sanction of the government, consists in the construction of two main canals leading from a dam, to be fed by the river Soane. These will extend in opposite directions to a distance of ten or twelve miles, when they will branch off into two fan-like systems of irrigation channels, extending on one side to the Kurumnassa and Ganges. There will also be navigation channels for facilitating the transmission of the crops to Benares, to the mouth of the Kurumnassa, to Arrah and to Patna. The aggregate dimensions will be 681 miles of irrigation, and 145 of navigation channels, or in all 826 miles. Through these water will flow at a speed of two miles per hour, while the supply will yield 3,124 cubic feet per second. The dam is proposed to be formed on the plan of the Madras Delta Works. The chief difference consisting in the depth of the undersunk foundations, which Colonel Dickens in his plan suggests, namely, two rows of blocks, 20 feet each in depth, whereas the wells at Madras range from 7 feet to 9 feet only. The principal impediment to the carrying out of the works is their enormous probable cost. The colonel, however, has entered into lengthy calculations to prove that the outlay would be amply compensated for by the enhanced productiveness of the land to be irrigated, and it is likely that a portion, at least, of the scheme will soon be commenced. As to its complete fulfilment we apprehend that that will depend much upon the future phases which the civil war in America may exhibit. The present condition of our own manufacturing districts should plead eloquently for the increased growth of cotton in India, and we should imagine that Lord Elgin could not more worthily inaugurate his succession to the Governor-Generalship than by paying immediate and practical attention to the momentous subject.

A Banquet in a Sewer.

The London *Express* says:—

On the 5th of May, at the invitation of Mr. W. Webster, the contractor for carrying out that portion of the metropolitan main drainage from Deptford to the outfall at Erith, the members of the Greenwich District Board of Works, and about 500 inhabitants of the locality proceeded to inspect the line of sewer previous to its being handed over to the Metropolitan Board. About twelve o'clock the company assembled in front of St. Alphage Church, Greenwich, the band of the Volunteer Rifles being in attendance, and the descent, which occupied some time, having been accomplished by means of a long ladder, a novel scene was presented. The immense archway of brickwork, the radius of which is struck from a center of 5 feet 9 inches, giving 11 feet 6 inches in the clear, or diameter, and of circular form, had been provided with a temporary floor for a distance of about one mile, and was lighted on both sides with lamps. The refreshment tables were abundantly supplied. The most interesting portion of the proceedings was the presentation of a testimonial from the inhabitants of Greenwich to Mr. Webster. The chair was occupied by Mr. Bristow, M. P., who presented the address to Mr. Webster, and observed that the sewer in which the large number before him were then assembled was, in his opinion, one of the greatest engineering works of modern times. A similar testimonial was presented to Mr. Jennings, agent to the contractor, who acknowledged the same in suitable terms. Several toasts were duly honored and addresses delivered, and after remaining underground about two hours the company ascended.

THERE are 17 horse railways in Pennsylvania, all in Philadelphia and Pittsburgh. Their cost was $3,240,987; length of roads, 106 miles; number of passenger cars, 427; number of passengers carried for the year, 18,775,225; total earnings, $1,219,721; total expenses, $930,287.

A FIRM which has been extensively engaged in the manufacture of boots and shoes, at Lynn, are about moving their business to Chicago. They will employ three hundred hands at the start.

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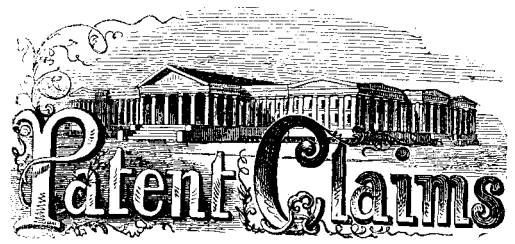

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MAY 20, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

35,286.—John Adams, of Pittsburgh, Pa., for Improvement in Preserve Vessels:

I claim the construction of the cover, C, with wedge-shaped projections, f f, in combination with the yoke, B, and the neck of the jar, as shown and described.

[This invention consists in a mode of securing the cover to the neck of the vessel by means of a double-hooked yoke catching under a fixed collar on the exterior of the neck of the jar and bearing upon circular wedge-like projections on the top of the cover, the said yoke being applied by putting it over the cover and neck, passing its hooks through notches or recesses in the collar, and then turning it round the neck till it comes to a fixed bearing on the wedge-like projections and so secures the cover firmly in place.]

35,287.—J. J. Alvord, of Tecumseh, Mich., for Improved Machine for Molding and Pressing Brick:

I claim, first, The rotating, clay-grinding or tempering device formed of the knives, D, and spiral flanches, C, shaft, B, and the stationary knives, E, in the cylinder, A, in combination with the feeding screw, G, in the box or receiver, F, and the rotary mold wheel, L, provided with the plungers, h, substantially as and for the purpose set forth.

Second, The box, T, placed transversely in the lower part of the box or receiver, F, and in such relation with the mold wheel, L, and protection, a', to operate as and for the purpose specified.

35,288.—S. E. Anthony, of Stillwater, N. Y., for Improvement in Shingle Machines:

I claim the arrangement of the saws, c i, the reciprocating gate, B, and the laterally adjustable reciprocating gate, D, with each other and with the bar, E, cleat, j, and carriage, F, the whole constructed and operating in the manner shown and described.

[This invention relates to an improved shingle machine of that class in which saws are employed to perform the work. The object of the invention is to obtain a machine by which the whole bolt may be sawed simultaneously into shingles of proper taper form, and to this end two gangs of saws are employed, one gang being placed in an ordinary reciprocating gate or frame which has a lateral as well as a reciprocating movement, all being so arrangsd as to obtain the desired result.]

35,289.—Sarah A. Baldwin, of Waterbury, Conn., for Improved Combination of Sofa and Bathing Tub:

I claim, as an improved article of manufacture the combined sofa and bathing apparatus, substantially as described and set forth.

35,290.—C. E. Bancroft, of Waterbury, Vt., for Improved Clothes Wringer:

I claim the shape and construction of the circular blocks, I I, arranged and operating as described and for the purposes set forth.

35,291.—L. A. Beardsley, of South Edmeston, N. Y., for Improvement in Hop Frames:

I claim the employment of electric insulators in combination with two series of horizontal wires running at a right angle with each other, substantially in the manner and for the purpose set forth.

I also claim the spreader, s, in combination with the divergent training cords, o and p, substantially as and for the purpose specified.

I also claim forming the training cords of wire intertwined with one or more fibrous strands, for the purposes specified.

I also claim the use of the hooks, t, having a sharp or annular inner edge, and otherwise constructed as described for the purposes set forth.

35,292.—M. C. Bogia, of Philadelphia, Pa., for Improvement in India-Rubber Sword Handles:

I claim combining a tube of gum elastic with the shank of a sword, dagger or other like weapon, substantially in the manner and for the purpose set forth.

35,293.—Jehu Brainerd, of Cleveland, Ohio, for Improvement in Depilating and Bating Skins:

I claim the described compound for depilating and bating hides and skins, the same being combined in one operation, as specified.

35,294.—S. A. Briggs, of Providence, R. I., for Improvement in Heaters:

I claim, first, The flues, H H, arranged within the drum, E, or at the upper part of the cold air pipe, D, and used in connection with the upper inverted conical parts, b d, of the furnace and cold air pipe, as and for the purpose specified.

Second, In combination with the flues, H H, the spout, J, provided with a central partition plate, i, and plates, h', and communicating with curved passages, h, in the flues for the purpose of rendering the same self cleaning, as set forth,

Third, The combination of the furnace, C, cold-air pipe, D, flues, H H, and pipes, I I, arranged as shown within the chamber, B, for the purpose specified.

[This invention consists in a peculiar manner of constructing the furnace in connection with a central cold air pipe, whereby a large volume of cold air may be heated in a comparatively short time and a great saving thereby effected in the consumption of fuel. The invention also consists in a novel construction and arrangement of flues, whereby economy in fuel is not only obtained but the flues also rendered self-sustaining.]

35,295.—J. S. Brown, of Washington, D. C., assignor to himself and Joseph Kent, of New Albany, Ind., for Improvement in Water Elevators:

I claim, first, The conical portion, b, of the windlass, or its equivalent, for conveying the raised bucket over the discharging spout, arranged and operating substantially as specified.

Second, I also claim the lever, I, and double branch chain or cord, m, acting in combination, substantially as specified, for lifting the valve.

Third, I also claim overbalancing the empty bucket, G, when suspended at or near the apex of the conical portion of the windlass by the crank or winch, C, substantially as and for the purpose set forth.

Fourth, I also claim the dripping spout, E, arranged and operating in combination with the discharging spout, D, substantially as and for the purpose specified.

35,296.—William Brown, of Petersburg, Pa., for Improved Washing Machine:

I claim the griping bar, D, hinged to the uprights, a a, in the manner described and shown, for the purpose set forth.

35,297.—Charles Bushor, of Philadelphia, Pa., for Improvement in Machine for Loading Coals, &c.:

I claim the arrangement of an elevator on a movable truck, for the purpose of loading coal, when the same are constructed and combined in the manner substantially as set forth and described.

35,298.—Alvin Cahoon, Jr., of Harwich, Mass., for Improvement in Combined Spirit Levels:

I claim the instrument described, consisting of two horizontal spirit levels at right angles one to the other, and one of them rendered adjustable in the vertical plane, for the purpose of determining the trim of a vessel, substantially as deseribed.

35,299.—L. S. Chischester, of New York City, for Improvement in Grain-Weighing Machines:

I claim, first, A series of buckets set between and revolving with heads on a shaft, when said buckets are hung on centers, and allowed a limited amount of motion, the same insuring accuracy of weighing, as set forth.

Second, I claim the employment of two cut-offs to the hopper, the first shutting off the main supply of grain, while the second regulates the supply necessary for making accurate weight, as specified.

Third, I claim the arrangement of mechanism shown, consisting of the arms, 6 and 7, and blocks, 5, for actuating the first and second cut-offs as the buckets and scale beam descend, as set forth.

Fourth, I claim the employment of the second or balancing weight, o, to act in insuring the accuracy of weight after the main body of grain has passed into the bucket, as set forth.

Fifth. I claim the weights, 8 and 9, to counteract the friction of the cut-off arms, 6 and 7, in the manner set forth.

Sixth, I claim the pawl, r, applied and acting in the manner set forth, to hold the bucket in place, and prevent any variation of the leverage of the same on the scale beam as the parts descend, as set forth.

Seventh, I claim the employment of the rollers, v v, and heads, f f, acting in the manner specified, to elevate the buckets and scale beam to their normal position, as each bucket comes to its place, as set forth.

35,300.—Abram Clow, of Port Byron. N. Y., for Improved Attachment of Whiffletrees to the Tow Lines of Canal Boats:

I claim the combination of the guard, g, with the hook, C, collar, B, and catch, D, all of said parts being constructed and operating as set forth.

[This invention relates to a mode of attaching whiffletrees to the tow-lines of canal boats, whereby the whiffletree may be instantly detached from the towline when the latter is drawn taut, as, for instance, when a boat, in passing another one, has its towline catch against it, a contingency which frequently occurs, and which causes the horse to be thrown into the canal.]

35,301.—C. C. Converse, of Elmira, N. Y., for Improved Mangle:

I claim the pressure rollers, B C, and endless apron, L, in combination with the folding or extension frame, K, all arranged and applied to the framing, A, substantially as and for the purpose set forth.

[The object of this invention is to obtain a clothes mangle which will be simple and efficient in its operation and capable of being folded up compactly when not required for use. To this end the invention consists in the employment of one or two pressure rollers and an endless apron, the latter being applied to an adjustable or extension frame and arranged in such relation with the pressure rollers as to effect the desired result.

Mr. Converse's residence is Dubuque, Iowa, and not Elmira, N. Y., as above stated.]

35,302.—J. C. Currier, of Bradford, Vt., for Improvement in Window Sashes:

I claim a window sash having its top and bottom rails, b b, formed of two parts, 1 2, and its cross pieces, c, and stiles, a a, grooved, as shown, to admit of the insertion and securing of the panes, e, in the sash, substantially as shown and described.

[This invention relates to an improved manner of securing the lights or panes of glass in the sash, whereby the use of putty or any other plastic substance is entirely avoided and the panes not only secured in the sash so as to have water-tight or weather-proof joints, but also in such a manner as to admit of being very readily inserted in the sash or removed therefrom, so as to facilitate the removal of broken panes and the insertion of new glass therein without injuring the sash, as is frequently the case in cutting away the putty, which becomes quite hard by age.]

35,303.—H. G. Davis, of New York City, for Improvement in Extension Splints:

I claim the described splint composed of the tube, A, threaded part, B, and vent or equivalent, C, as a new article of surgical apparatus, the same being adapted to operate in the manner and so as to realize the advantages set forth.

35,304.—S. F. Day, of Ballston Spa, N. Y., for Improvement in Instruments for Telegraphs:

I claim, first, The combination with the sounding lever, 6, having one or more armatures attached, and with the spring, 13, of the adjustable counterpoise or balance weight, 9, substantially as and for the purpose set forth.

Second, The combination of the adjustable counterpoise or balance weight, 9, the sounding lever, 6, having armatures, 7 7', attached, and spring, 13, with one or more U-electro magnets, constructed and arranged substantially as and for the purpose set forth.

35,305.—R. E. Dixon, of New York City, for Improvement in Tobacco Pouches:

I claim the arrangement and combination of the pipe case, A, valve, g, and tobacco pouch, B, substantially as described, so as to keep the two entirely separate from each other, but so that the pipe can be loaded whenever desired, without opening the pouch or without the use of the fingers to load it as is usually necessary.

35,306.—A. P. Durant, of Atlanta, Ill., for Improvement in Combined Cultivator and Seeding Machine:

I claim, first, The arrangement of the hopper box with its shaft operated as described and by the means described, with the cultivator constructed and operated as described.

Second, The arrangement of the sliding beam, D, with the levers, H and I, and in connection with the cultivator beam, G, to enable the driver to operate the same, as described.

35,307.—W. H. Earnest, of Clarksburg, Va., for Improvement in Cradles:

I claim the employment of pivoted arms, G G, upon the rocker or rockers of cradles of the description represented and specified, for the purposes set forth.

[This invention consists in the application of pivoted stops to the rockers of a cradle for the purpose of preventing the motion of the cradle when the baby is asleep, or when it is awake to prevent the body falling out on the floor by the tilting or upsetting of the cradle.

Mr. Earnest's address is Parkersburg, Va.]

35,308.—N. F. English, of Hartland, Vt., for Photographic Apparatus:

I claim the combination with the box, A B B C C, and the lid, D, of the end pieces, G G, top piece, E, and front piece, F, the whole applied and arranged substantially as specified,

Second, Combining the water fountain or vessel, K, and the vessel, L, from which the developing fluid is used by means of valves, k p, and a shoe piece, N, or its equivalent, making one outlet for both vessels, substantially as and for the purposes specified.

35,309.—W. D. Grimshaw, of Newark, N. J., assignor to himself and C. A. Teneyck, of New York City, for Improvements in Forging Hammers:

I claim, first, The lifting slot, 5, formed as shown, and arranged in connection with the crank pin, 4, shaft, 2, ratchet wheel, l, pawl, 3, and wheel, h, as and for the purposes specified.

Second, I claim arranging the hammer, q, arm, o, parallel motion bar, r, and lifting rod, n, in the manner and for the purposes specified.

Third, I claim the arrangement of the wheel, h, belt, i, shaft, f, and pinion, e, in combination with the forging hammer and series of anvils, in the manner and for the purposes specified.

Fourth, I claim the air cylinders, t, with the valves, 10 and 11, in combination with the wheels, h and l, shaft, 2, rod, n, and arm, o, to the hammer, q, the parts being arranged and acting as and for the purposes specified.

35,310.—E. D. Griggs, of Waterbury, Conn., for Improvement in Photographic Albums:

I claim combining the mat with the pieces, A B B, by means of a flanch, a a, interposed and secured between the said pieces, substantially as specified.

35,311.—W. F. Goodwin, of Powhatan, Ohio, for Improvement in Breech-Loading Ordnance:

I claim, first, The method of locking the breech piece with, and unlocking it from, the rear end of the barrel, by means of one or more keys passing through the breech and entering recesses in the barrel, as described, and by combining with said keys a system of levers arranged in relation to the breech handle and the said keys so as to operate the latter in the act of depressing the breech, by grasping the handle, as set forth.

Second, The method described of constructing the breech piece in three parts, under the arrangement set forth, and when combined with wedges or keys to tighten the breech, and thus insure perfect frictional contact of the breech and barrel.

Third, Providing the sides of the rear end of the barrel with trunnions upon which to hang the breech, in combination with the steps or projections and grooves, in the manner and for the purpose set forth.

35,312.—Richard Griswold, of Bainbridge, N. Y., for Improvement in Metallic Pens:

I claim a pen, A, provided with a longitudinal plate, B, inserted in its slit, a, so as to project above and below the pen, about at right angles therewith, substantially as and for the purpose set forth.

[This invention consists in applying to an ordinary metallic pen a plate, which is fitted in the slit of the pen, and so arranged that the pen is rendered capable of holding a much larger amount of ink than usual, so as to avoid as frequent dipping and replenishing, and cause the pen, when in use, to shed the ink freely, without the liability of making blank or imperfect marks or strokes, and also to insure the marks or strokes being made of a width equal to the spread of the pen, whether the same be coarse or fine.]

35,313.—J. D. and A. M. Halsted, of Rye, N. Y., for Improvement in Hand Cultivators:

We claim the combination of the sets of knives, 1 1, as described, with the arms, 2 2, to which they are attached, and with the clip, 5, shaft or axle, 3, wheels, 4, handle, 7, and clamps, 8 8, the whole being constructed and arranged, substantially as described and operated as set forth.

35,314.—A. K. Hay, of Winslow, N. J., for Improvement in Glass Furnaces:

I claim the described furnace, composed of the heating compartment, with its two fireplaces, C and C', platform, D, and two pits, E E, the intermediate compartment, with its platforms, L L, and its continuation of the said pits, and the annealing compartment, H, the whole being arranged substantially as and for the purpose set forth.

35,315.—Reuben Hoffheins, of Dover, Pa., for Improvement in Harvesters:

I claim, first, A combined reel and rake, rotating upon a vertical axis, and having its arms successively turned up into an inverted position, so as to pass over the main frame, substantially as explained.

Second, The inclined standard, I, rigidly mounted upon a loosely-hinged platform, and employed to support a revolving reel and rake in an unchangeable position in relation to the platform, without obstructing the free motion of the latter.

Third, The yielding and swiveled rod, Q, operating in combination with the band, P, and pulleys, O and R, in the manner and for the purposes shown and explained.

[This invention relates to certain improvements in mounting and operating an oblique reel and rake, whereby it is rendered more effective in its action on the standing grain, and in removing the gavels from the platform, and afterward elevated from the ground, in such a way as to avoid scattering the cut grain.]

35,316.—J. R. Howard, of Worcester, Mass., for Improved Fountain Blacking Brush:

I claim the described blacking brush, consisting of the brushes, the reservoir and the self-closing apparatus, when constructed and operating, substantially as set forth.

35,317.—Samuel Keeler and Jacob Barthel, of Lancaster, Pa., for Improvement in Seeding Machines:

We claim the improvement in the cylinder, by making it with flanges adjustable, as described.

35,318.—John Lemman, of Cincinnati, Ohio, for Improved Mortising Machine:

I claim the mode of supporting and guiding the mandrel on the curved bar, F, adapted for vertical and angular adjustment, substantially as and for the purposes set forth.

35,319.—W. A. Lighthall, of New York City, for Improvement in Condensers for Making Potable Water:

I claim the combination of the discharge pipe, A, with the series of cooling tubes, D, arranged and operated as and for the purpose set forth.

35,320.—Edwin May, of Indianapolis, Ind., for Improvement in Apparatus for Casting Bullets:

I claim, first, The casting of conical and hollow bullets, and swaging the same while the lead is in a plastic state, by means of the molds, i i, in combination with the plungers, h h k k, and the springs, e e e e, when constructed and operated, substantially as and for the purposes set forth.

Second, The adjustable molds, i i, and clamps, j j, in combination with the lever, a and d, when constructed and operated, substantially as and for the purposes set forth.

35,321.—J. H. Mead, of New York City, for Improved Soap Cups for Washstands, &c.:

I claim, as a new article of manufacture and trade, a dish or vessel, having its bottom constructed substantially as described and for the purpose set forth.

35,322.—J. W. Moore and W. H. Elliot, of Plattsburgh, N. Y., for Improvement in Lanterns for Marine Telegraphs:

We claim, first, The alternate arrangement of the colored glasses, m, with the opaque divisions, n, when these are employed with opening, j, in the outer shell, a, as and for the purpose specified.

Second, The alternate of the glasses, m, and reflectors, n, in the revolving lantern, b, as and for the purpose specified.

35,323.—J. B. Murray, of New York City, for Improved Mode of Collecting Letters on Street Railroad Cars:

I claim collecting and conveying letters and other mail matter to the post office, in towns and cities, by means of properly-secured letter boxes or other suitable repositories, for the reception of drop letters, in combination with street railway cars, or other suitable public vehicles, such as are used for local passenger conveyance on stated routes, in towns and cities, substantially as described.

35,324.—J. H. Newcomb, of Port Norris, N. J., for Improvement in Dredging Machines:

I claim the application of guards or fenders, c d e c' d' e', to machines for dredging oysters, coal, or other sunken objects, said guards or fenders being constructed and operating, substantially in the manner and for the purposes set forth.

35,325.—Henry Redlich, of Chicago, Ill., for Improved Apparatus for Corking Bottles:

I claim the box, A, provided with an inverted conical bore, B, and plunger, D, in combination with the movable cap, C, substantially as and for the purpose set forth.

[The object of this invention is to obtain a simple and efficient device, by which the bottles may be corked and the corks compressed to fit the bottles at one operation.]

35,326.—W. B. Ryan, of East Pembroke, N. Y., for Improvement in Potato Digger:

I claim giving the shaker, L, an up-and-down percussive motion, as distinguished from a horizontal vibrating motion), by means of the rock shaft, K, and arms, K', wheel, n, trips, n', and constructing rods, M, substantially as set forth.

I also claim the hinged frame, G, in combination with the shaker, L, arms, H, rods, F and M, and cutter, E, for the purposes, and substantially as described.

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35,327.—O. Sage, of Wellington, Ohio, for Improvement in Cheese Vats:

I claim the combination with the lower part of the water box or chamber, of an oblong or top-inclined furnace, having inclined cross tubes, the parts being arranged in relation to each other as and for the purposes set forth.

35,328.—F. A. Salisbury, of Greene, N. Y., for Improved Knife-Cleaning Box:

I claim, as a new article of manufacture, the polishing box, D, having a wire gauze or a perforated bottom, in combination with the rubber, C, the whole being arranged, operated and incased in the box, A, substantially in the manner described and for the purposes specified.

35,329.—Gerad Sickles, of Roxbury, Mass., for Improvement in Metal Plates for Protecting the Soles of Boots and Shoes:

I claim, as a new article of manufacture, a protector for the soles of boots and shoes, consisting of a small disk of metal, formed with sharp points or spurs around its periphery, projecting at right angles to the plane of the disk, and adapted to secure it to the sole by driving into the leather, as described.

[This invention consists in a peculiar form of metal plate, which may be applied to the soles and heels of boots at trifling cost, thereby greatly increasing their wear, without materially adding to their weight.]

35,330.—Nelson Silvester, of Granger, Ohio, for Improved Foot Corn Planter:

I claim the lever, J, and shovel, I, in combination with the platen, G, and piston, H, arranged and operating as and for the purposes set orth.

35,331.—S. E. Southland, of Jamestown, N. Y., for Imroved Device for Fastening Cattle:

I claim, first, The arrangement of the suspended swinging frame, D, so constructed, by means of hinged joints or their equivalents, as to swing forward and backward in combination with neck bars, A A′, or their equivalents, constructed and operating substantially as and for the purpose set forth.

Second, The neck bars, A A′, connected at the bottom by a pivot, c, or its equivalent,and so constructed as to open and close, and to swing forward and back, and right and left, substantially in the manner and for the purpose shown and described.

Third, The arrangement of the longitudinally-sliding bar, E, in combination with the swinging neck bars, A A′, constructed and operating substantially as and for the purpose specified.

[The object of this invention is to arrange the means employed for astening and unfastening cattle, in such a manner that by a single movement a whole row of cattle can be fastened or unfastened simultaneously, leaving the cattle free at the same time to move their heads in either direction, or to lie down and get up without difficulty.]

35,332.—John Sperry, of New York City, for Improvement in Veneer Cutting Machines:

I claim suspending the log carrier, A, or the knife, F, from two or more pivots, a, projecting from rotary or oscillating arms or disks, B, substantially in the manner and for the purpose shown and described.

And I also claim imparting to the log carrier or to the knife a rotary drawing motion, substantially such as described, for the purposes set forth.

35,333.—W. T. Spies, of Baltimore, Md., for Improvement in Railroad Car Coupling:

I claim the combination and arrangement of the movable block, with its notch for holding and regulating the coupling link with the concave and convex form of the coupling link, and the convex form of the inside seat of the buffer, in the manner described, and for the purpose of forming a self-coupling buffer for the connection of railroad cars.

35,334.—C. B. Tatham, of Brooklyn, N. Y., for Improvement in Apparatus for Casting Minié Balls:

First, I claim the means, substantially as described, of forming the hole in the base of the ball by a core held in its place within the chamber, by its contact with the piece or pieces which form the same, so that any expansion or motion of the mold will carry the cores therewith, and maintain their central position within the chambers.

Second, In combination with means substantially as described, of preserving the centrality of the cones under movements or varying expansion of the mold, I claim removing a number of such cores, and returning them to their places at a single operation, by the means substantially as described.

Third, In combination with means substantially as described, of preserving the centrality of the cores, and with means substantially as described of removing and returning to their places a number of such cores, I claim the use of chambers, so located and arranged as to be filled through the points thereof, and to allow the metal to set under a head, with the points of the balls directed upward, for the purpose of simplifying the construction of the apparatus, and of increasing the solidity of the balls.

5,335.—Miner Van Auken, of Amsterdam, N. Y., for Improved Clothes Wringer:

First, I claim the application and use of one or more lever cores, h, or their equivalents, substantially in the manner and for the purpose set forth.

Second, I claim the spring, G, or its equivalent, constructed and applied substantially in the manner and for the purpose set forth.

Third, I claim, in combination with the boxes, F, and crank screw, H, extending the lower limb, m, of the spring, G, outside the standards, A, or in an equivalent manner supplying the means whereby the lateral movement of the spring may be prevented, as described.

Fourth, I claim the application of the lever screw, H, or its equivalent, in such manner as to permit of the oscillation of the spring, G, substantially as described.

Fifth, I claim the application of a single lever knee, P, or its equivalent, to the girt, C, substantially in the manner and for the purpose set forth.

Sixth, I claim the eccentric lever arms, V, or their equivalents, for the purpose set forth.

Seventh, I claim one or more relief rolls, or their equivalents, as and for the purpose set forth.

35,336—J. E. Thomson, of Buffalo, N. Y., for Improvement in the Manufacture of Illuminating Gas:

I claim the manufacture and use of an illuminating gas produced by a combination of petroleum or rock oil, or other hydrocarbon gases, petroleum being used by preference, with combination gases produced by the action of water in a spheroidal state on hydrocarbon vapors, substantially as described.

35,337.—Julius Thompson, of Taunton, Mass., for Improvement in Screw Drivers:

I claim the combination of the lever, B, with screw driver, A, substantially as described and for the purpose specified.

35,338.—Madison Vedder, of New York City, for Improvement in Catamenial and Urinal Bandages and Receptacles:

I claim, first, The combination of the catamenial receptacle, A, and urine pouch, B, substantially as and for the purpose specified.

Second, Providing for the ventilation of a catamenial receptacle by means of holes, i i, in the sides thereof, substantially as set forth.

Third, Making the connections, C C′, between the front and back of the catamenial receptacle, and the girdle, which attaches it to the body or any portion of such connections, of tubular form, whereby they are made to serve the additional purpose of ventilating the receptacle, substantially as specified.

[This is a very useful apparatus for ladies traveling.]

35,339.—Julius Von Hofe, of New York City, for Improvement in Tips for Fishing Rods:

I claim the fishing-rod tip formed with the guide, o, and receiving the sheave, i, in the manner and for the purposes substantially as specified.

35,340.—C. H. Walker, of Warren, Mass., for Improved Chest of Drawers:

I claim, as a new article of manufacture, a chest, A′, provided with drawers, A, sieve, B, drawers, C D E, adjustable molding board, F, extension, I, slide, M, and closet, N, all arranged in the manner and for the purpose described.

[The object of this invention is to produce a receptacle capable of holding all the articles generally used by housewives in transacting their household duties, in a compact form and with a handsome exterior.]

35,341.—Gustav Wedekind, of Philadelphia, Pa., for Improved Shade Holder for Gas Burners or Lamps:

I claim the combination of the clasp, open ring, or buckle, d, with a shade holder, substantially as and for the purpose set forth.

I also claim, in combination with the shade holder, the supports, i, in the braces for holding a chimney or protector, substantially as described.

35,342.—C. S. Westcott, of New York City, for Device to Prevent Opening Letters without Discovery:

I claim the formation of any letter, inscription or device upon a letter, envelope or material to be used as a seal, in an ink, or paint, which will be destroyed or defacee by an attempt to open a letter, envelope or package upon which the same is placed.

35,343.—J. R. Whittemore, of Chicopee Falls, Mass., for Improvement in Rakes for Harvesters:

I claim the combination of the rake, O, and plate cam, G, when arranged substantially in the manner and for the purpose described.

36,344.—Hosea Willard, of Vergennes, Vt., for Improved Looking Glass:

I claim, as a new article of manufacture, a mirror or looking-glass for domestic or household use, constructed of a plurality of panes placed in contact with each other so as to form a longitudinal section of a polygon, as set forth.

[This invention relates to a new and improved mirror or looking-glass for domestic or household use, and consists in constructing the mirror of a plurality of panes so placed as to form a longitudinal section of a polygon, and admit, when suspended or fixed in proper position, of several persons using the mirror at the same time without in the least interfering with each other.]

35,345.—E. C. Wilson, of Peekskill, N. Y., for Improved Stair-Rod Holder:

I claim the application of the clasping spring, b, with the back, c, and point, a, all arrange as a stair-rod holder, substantially as described.

35,346.—Isaac Winslow, of Philadelphia, Pa., assignor to J. W. Jones, of Portland, Me., for Improved Process of Preserving Green Corn:

I claim the described process of preserving indian corn n the green state, without drying the same, the corn being sealed hermetically in cans or other vessels, and then exposed to heat, substantially in the manner add for the purposes set forth.

35,347.—T. C. Ball (assignor to himself, D. M. Smith, H. H. Mason and A. C. Mason), of Springfield, Vt., for Improvement in Blind and Shutter Supporters:

I claim the combination of the catch, D, with the blind and the lifting hooks, E F, in the manner and for the purpose shown and described.

[The object of this invention is to obtain a fastening of simple construction, which will serve, when the shutter or blind is secured in either an open or closed state, as a support to the same, and prevent it from sagging.]

35,348.—John Howe, Jr., F. M. Strong and Thomas Ross (assignor to John Howe, Jr.), of Brandon, Vt., for Improvement in Portable Platform Scales:

We claim, first, The lever frames, B B′, and platforms, C, placed within the lower part, A, of a box; in combination with the beam, G, placed within the upper part or cover, F, of the box, and connected to the lever frames, as shown, and all arranged in such a manner as to admit of the part or cover, F, when the scales are not in use, being folded down on the part, A, to form a receptacle for the scales, as set forth.

Second, The slide, L, and arm, p, or their equivalents, when placed within the box or the cover thereof, and in relation with the beam, G, as shown, for the purpose of raising the fulcrum, h, of the beam off from its bearings, and preserving them from wear.

Third, The elastic bearings, O O′, in combination with the scale and box, all arranged as and for the purpose set forth.

Fourth, The hook, k, and spring, l, when used in connection with the box and scale, and placed in such relation with the weight supporter, I, to properly hold the same when the box is in a closed state.

Fifth, The rod or shaft, i, provided with the plate, u, and fixed weights, t, substantially as shown, for the purpose of holding the scale weights, s, when not in use, within the box, as set forth.

[The object of this invention is to obtain a platform scale which will be capable of being folded so as to form a very compact article when not required for use, and have all its parts so protected that they cannot be injured by transportation under ordinary care, and at the same time admit of being very readily adjusted for use. The invention is more especially adapted for army use, but may be advantageously employed in other cases.]

35,349.—C. F. Martine, of Dorchester, Mass., assignor to himself and R. H. Emerson, of Lynnfield Center, Mass., for Improvement in Lamps:

I claim the tube, C, open at both its top and bottom, its lower end being at or near the top of the wick tube, and its upper end projecting above the wick, the whole constructed, arranged and operating substantially in the manner and for the purpose specified.

35,350.—J. M. Moss, of Waverly, Iowa, assignor to himself and E. H. Williams, of Clermont, Iowa, for Improvement in Pans for Evaporating Saccharine Juices:

I claim, first, The construction of an evaporator so that the opposite sides or ends of the pan or pans may be raised and lowered alternately at the will of the operator, thereby thoroughly stirring the contents of the pan or pans, and cooling the bottom or bottoms thereor.

I claim, second, The construction of an evaporator with pans or a pan that one side or end of which may be raised and lowered more or less rapidly, at the will of the operator.

Third, I claim the construction of an evaporator with a series of pans, in which the finishing pan, or the pans in which the evaporation is completed, are raised and lowered in the manner set forth and described.

35,351.—John Power, of Boston, and A. J. Bailey, of Charlestown, Mass., assignor to Peter Holmes, of Charlestown, Mass., for Improved Machine for Cutting Cork Stoppers for Bottles and other Vessels:

We claim, first, The combination of the reciprocating cutter, L, and rotating mandrel, C, when arranged substantially as shown, so that the latter will have a continuous rotary motion imparted to it in one and the same direction by the reciprocating movement of the cutter, for the purpose set forth.

Second, The cap, K, of slide, I, with the knife, L, and spirally-grooved shafts, J J, attached in combination with the sliding rack, O, pinions, N N, and his pins, h e′, arranged substantially as shown, for elevating and depressing the knife, L, for the purpose specified.

35,352.—Osmond Reed (assignor to himself A. D. Chesebro), of Paris, Mich., for Improved Hay Rigging:

First, I claim the wooden or iron arms constructed in the form substantially as and for the purposes described.

Second, The adjustable joint at the end of the projecting arms, for the purposes described.

Third, The verticle arm with the hook or ring at the top, for the purposes described.

35,353.—Joseph Rusch (assignor to himself and Joseph Lux), of New York City, for Improvement in Attaching Armor Plates to Vessels:

I claim the combination of the additional planking or bed, B B, bolt, C, continuous clamp, D, and grooved armor plate, E E, all constructed and applied in the manner and for the purposes shown and described.

35,354.—J. M. Seymour (assignor to E. H. Ashcroft), of Boston, Mass., for Improvement in Gas Check for Breech-Loading Firearms:

I claim the space, a, and the shoulder, d, arranged and combined with the expansive breech plug and its socket, substantially in manner and so as to enable the said breech plug to operate as specified.

35,355.—W. C. Vosburgh and W. A. Ludden, of Brooklyn, N. Y., for Improvement in the Means of Attaching India Rubber to Pencils:

We claim the employment of the semi-cylindrical clamps, b b, formed as specified, and a ring or rings, d, in combination with the section of india rubber, c, and the pencil or pen handle, a, for the purposes as set forth.

35,356.—Henry Kellogg, of New Haven, Conn., for Improvement in Breech-Loading Firearms:

I claim, first, The combination and arrangement of the pawl or catch, D, with the trigger, F, operating in the manner and for the purpose substantially as set forth.

Second, I claim the combination and arrangement of the spindle, H, crosshead, K, and slots, L, in the manner and for the purpose substantially as set forth.

Third, I claim the spring catch, f, in combination with the spindle, H, crosshead, K, and slots, L, in the manner and for the purpose substantially as described.

RE-ISSUE.

1,310.—R. B. Goodyear, of Elkton, Md., formerly of Philadelphia, Pa., assignee of A. Bowie and Charles Carr, assignees of the said R. B. Goodyear, for Improvement in Apparatus for Operating Shuttle Boxes of Looms. Patented March 13, 1849. Antedated Sept. 13, 1848:

I claim the employment, for the purpose of weaving, of an index plate having movable and adjustable pins projecting at different distances from the face of said plate, in combination with the shoe, H, or its equivalent, for the purpose of raising and falling the shuttle boxes to correspond with the pattern desired to be formed, the whole constructed and arranged in the manner described.

EXTENSION.

5,575.—A. T. Serrell, of New York City, for Improvement in Machinery for Making Moldings. Patented May 16, 1848. Re-issued Jan. 7, 1851, and June 21, 1853:

I claim the application of the changeable-feeding rollers, c 1, made as disks or flat rings, with serrated edges of varying angles, and changeable or unequal diameters to feed in materials cut in varying or irregular sections, in combination with changeable rotary cutters and changeable standing planes, to produce wood moldings of different sizes, with smooth surfaces from material cut or prepared in varying or unequal sections for such purposes; the whole applied, constructed and operating substantially in the manner and with the effects described and shown.

DESIGNS.

1,582.—James Paterson, of Elizabeth, N. J., assignor to Deborah Powers, A. E. Powers and N. B. Powers, of Lansingburgh, N. Y., Design for a Floor-cloth Pattern.

1,583 to 1,594.—H. G. Thompson, of New York City, assignor to Hartford Carpet Company, Twelve Patents for Designs for Carpet Patterns.

Books and Publications Received.

DAVIES'S PRIMARY ARITHMETIC. By Chas. Davies, L.L.D., Author of a full Course of Mathemetics. Published by A. S. Barnes & Burr, New York City.

This work is designed for young children, and is constructed upon the plan of object teaching, by presenting to the mind of the pupil the number or figure in connection with other objects of the same kind. It is a most capital arithmetic, and we can indorse its good qualities in the fullest sense. Dr. Davies is well known as one of the first mathematicians of the present day.

THE ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston.

The June number of the *Atlantic* is equal to its predecessors, but we are amazed at the taste that can admire Lowell's doggerel.

BALLADS OF THE WAR. Published by John Robins, No. 37 Park-row, New York City.

We have received the first number of a most elegantly printed and illustrated poetical work bearing the above title. The subject which fills this number is entitled "The March to the Capital," and is written by Augustine J. H. Duganne. It is a stirring patriotic composition. All the prominent events of the war are to be chronicled in the same poetic manner. The engravings are superb.

THE BOY SOLDIER; Infantry Tactics for Schools. Messrs. A. S. Barnes & Burr, New York City.

This work, of 180 pages, with numerous illustrations, explains the details of infantry tactics so fully and clearly that "greenhorns" in the art may acquire the principles of soldiering without employing a regular drill master, and then if the student has the requisite pluck he can enlist and fight for his country whenever her sons are needed for this purpose. Every man has now a good chance to become a theoretical soldier by getting this book of tactics.

BLACKWOOD'S EDINBURGH MAGAZINE, for May; THE LONDON QUARTERLY REVIEW, and the WESTMINSTER REVIEW, for April. Republished by Leonard Scott & Co., 79 Fulton street, New York City.

The best literature in the world.

HUNT'S MERCHANTS' MAGAZINE.—Published by William B. Dana, 61 and 63 William street, New York City.

While this standard publication maintains its established reputation for accuracy, it has received new life and spirit from its present proprietor.

AMERICAN JOURNAL OF SCIENCE AND ARTS. Published by William B. Silliman, B. Silliman, Jr., and James B. Dana, at New Haven, Conn.

We observe that this publication is quoted more and more by European scientific works of the highest character.

JOURNAL OF THE FRANKLIN INSTITUTE. Published by the Franklin Institute, at their hall, in Philadelphia.

THE MEDICAL AND SURGICAL REPORTER. Published by Lippincott & Co., 144 and 146 North Fifth street, Philadelphia.

THE NEW YORK DENTAL JOURNAL. Published by W. B. Roberts, 691 Broadway, New York City.

BUFFALO MEDICAL AND SURGICAL JOURNAL. Published by J. F. Miner, M. D., Surgeon to Buffalo General Hospital, Buffalo, N. Y.

HALL'S JOURNAL OF HEALTH. Edited and Published by W. W. Hall, M. D., 42 Irving Place, New York City.

THE AMERICAN JOURNAL OF PHOTOGRAPHY AND THE ALLIED ARTS. Published by Charles A. Seely, A. M., Editor and Proprietor, 244 Canal street, New York City.

THE INDUSTRIAL CHEMIST. Published by John Hillyer, No 249 Pearl street, New York City. Edited by Prof Dussauce, of the Imperial Laboratories of France.

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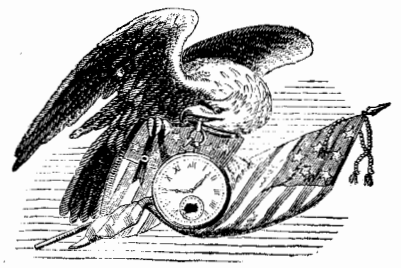
PATENTS FOR SEVENTEEN YEARS.



The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes n the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
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The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

J. H. P., of Conn.—It is common to fasten strips of rubber or listing to the jambs of a door to prevent the dust and cold from entering and also to prevent slamming. Nothing patentable in your suggestion.

H. J. H., of R. I.—Conical shot having spiral grooves on the cone are not new. The same thing has been shown to us a number of times.

J. R. G., of Ky.—By the new law which went into operation in 1861 the Commissioner of Patents is authorized, but not required, to return to their owners the models of rejected applications. But as yet no commencement has been made in these returns. Rejected models are now preserved with much care, in neat cabinets, and when they are two years old they are placed on public exhibition. The whole of the new and splendid hall which pertains to the west wing of the Patent Office is now occupied by these models. They are not, as you suppose, "consigned to the bats and moles." Your ideas upon what is needed to obtain patents are not correctly based. The Patent Office is carried on in a much more liberal spirit towards inventors than it formerly was, and it is now rarely that an applicant fails to receive a patent for anything which actually shows invention. It is only when a party has invented nothing new that he is denied a patent.

R. S. L., of Ohio.—Water flows from an aperture in the side of a vessel with a velocity equal to that acquired by a body falling from the surface of the water to the level of the aperture. Where the aperture reaches to the surface the velocity is ·443 of the theoretical velocity at the lower edge of the aperture, including the allowance for the contraction of the vein. With an opening at the surface 4 inches deep and 24 inches wide, you will have 1·367 cubic feet per second, equal to 82·2 feet per minute. Multiplying by 62½ you have 5,126 lbs. per minute, which falling 12 feet gives 61,512 foot pounds of work per minute, equal to 1·89 horse power. If your wheel yields 70 per cent you will have 1¾ horse power—quite as much as any two horses will actually perform. If your load or resistance is constant, a good turbine will be the best wheel for your purpose, but turbines are not recommended where the load is subject to frequent and considerable variations.

J. O. M., of N. J.—Blind-hinges have been patented to keep the blinds open without the aid of catches. There are a number of patents for devices capable of accomplishing this. If you have a plan send us a sketch and we will examine it.

B. F. Griffin, of Manhattan, Kansas, wishes to open correspondence with patentees or manufacturers of self-adjusting wind mills.

H. R. T., of Conn.—The London *Engineer* is a valuable journal; you can procure it through the agency of Messrs. Willmer & Rogers of this city. Bourne's Catechism of the Steam Engine, latest edition, you will find a useful practical work. We presume you can obtain it of John Wiley, No. 56 Walker street, N. Y.

G. W. S., of Pa.—The firing of the charge at the center has been provided for in fire arms and ordnance by various arrangements of tubes. In small arms the vent has been continued forward through the breech by permanently fitting the breech with a taper steel tube. In ordnance a tube filled with powder has been inserted at the vent, and such a tube has been constructed with branches to fire the charge at two points. We do not think there is any thing patentable in your invention.

H. O. P., of Mass.—We believe the first Mechanical Report of the Patent Office was issued by government in 1844. We have no data respecting the first issue of the Agricultural Report. The reports for 1861 are not yet issued. We have no information about the use of mastic gum in Paris as a substitute for paraffine

O. C. H., of Conn.—Plumbago for electroplating requires to be very pure and fine. All that has been used in the country has been prepared by one man, Mr. Thoureau, and he has recently died. It was sold by L. L. Smith, now of College Point, Long Island.

R. P. C., of Vt.—Nearly all of the gold used in the arts is alloyed, and if it is placed in nitric acid the particles of base metal at the surface will be dissolved, leaving the gold, and of course giving the mass the color of pure gold. Probably the white appearance which you observe on the surface when you immerse a lump of gold in muriatic acid, results from the silver in the alloy being formed into the chloride of silver.

J. P., of Mich.—The sediment which you find in your maple sugar pans was doubtless introduced in the process of collecting or boiling the sap. It was not mingled with the sap in the tree.

Photographer, of Pa.—The *American Journal of Photography*, is quoted very largely and with the highest respect by the European photographical publications. The editor and proprietor, Prof. Charles A. Seely, is doubtless as thoroughly informed in relation to photography and the sciences to which it is allied as any man in the world. The work is published at 244 Canal street, this city, at $2 per annum.

W. N., of Ill.—The usual mode of igniting gunpowder by electricity is to break the wire within the charge, and connect the ends by a short piece of very small platinum wire. On closing the circuit the platinum wire becomes red hot, and fires the powder.

J. B. C., of Ill.—Davis's Manual of Magnetism is a very plain treatise, though you may find all you want in Wells's Natural Philosophy, or Silliman's Natural Philosophy.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000 ; Belgium, 5,000,000, Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, May 28, 1862:—

J. McN., of Pa., $20; W. C. S., of N. Y., $20; W. E. B., of R. I., $20 ; P. S. C., of N. Y., $20 ; P. P., of N. Y.; $20; N. T. B., of Iowa, $45; G. L. T., of N. Y., $20 ; G. M. T., of N. Y., $20; H. & D., of Vt., $20; B. F. S., of Vt., $20; S. R. B., of Ill., $20; J. G. C., of Pa., $25 ; T. & M., of Conn , $15; A. S. B., of Conn., $15; C. E. S., of Wis., $80; H. M., of O., $25; C. B., of N. Y., $15; H. M., of Mass., $10 ; J. A., Jr., of Ill., $25; B. D., of Conn., $25 ; W. S. H., of O., $15; S. S. B., of O., $25; J. G. Y., Jr., of Me., $15; N. K. G., of Conn., $15; W. H. J., of Ind., $30; H. W. O., of Conn., $25; W. H. W., of N. Y., $15 ; S. E. T., of Wis., $15; C. A. M., of Pa., $25; P. & S., of Ill., $25 ; C. M. A., of Pa., $25; J. H. H., of N. H., $15; W. J. L., of Ind., $10; H. T. P., of Mass., $15; A. L. W., of Mass., $250; J. A. McC., of N. Y., $20; A. S., of N. Y., $45 ; M. & B., of Iowa, $10 ; J. B. D., of Conn., $35; I. R. S., of Va., $15: W. C., of Pa., $25; H. M., of N. H., $25 ; J. E., of N. J., $55; G. E. H., of N. Y., $25 ; T. V. N., of Ill., $25; W. W. K., of Pa., $10; B. Bros., of N. J., $15 ; J. H. & G. W. S., of N. Y., $15 ; J. H. T., of N. J., $15; E. C. G., of Cal., $50; G. P. B., of Pa., $25; W. G. R., of Pa., $22 ; H. C. J., of Me., $25 ; C. O., of Ill., $25; R. P., of Mass., $35; S. H., of Pa., $30 ; A. R., of Iowa, $40; J. P. S., of Mich, $25 ; A. I., of Pa., $15 ; E. T., of Pa., $15. ; R. H., of Ill., £15; M. C. B., of Minn., $15; C. B., of Iowa, $15; F. & G., of N. Y., $225; J. M. & W. C. W., of Iowa, $15. B. R. A., of N. Y., $10 ; J. A. McC., of N. Y., $25; W. F., of Germany, $56; G. B. O., of N. Y., $15.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from May 21 to Wednesday, May 28, 1862:—

B. D., of Conn.; G. B., of N. Y.; W. C., of Pa.; J. B. D., of Conn.; J. H. G., of Pa.; W. F., of Germany (2 cases); J. A. McC., of N. Y.; A. S., of N. Y.; G. R. B., of Ill.; C. M. A., of Pa.; S. & F., of Pa.; H. W. O., of Conn.; J. A., Jr., of Ill.; W. M., of O.; W. B B., of Conn. (2 cases); W. J. L., of Ind.; J. D. C., of N. J., H. M., of N. H.; G. G. L., of Del.; H. M., of Mass.; C. B., of N. Y.; B. R. A., of N. Y.; C. E. S, of Wis. (2 cases); J. W. W., of Mich.; J. P. S., of Mich.; H. C. L., of Me. ; D. F. H., of Mich.; G. P. B., of Pa.; C. O., of Ill.; S. H., of Pa.; E. C. G., of Cal.; G. E. H., of N. Y.; R. & P., of Mass.; N. Z. P., of Ill.; T. V. N., of Ill.; J. E, of N. J. (2 cases)

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
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INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

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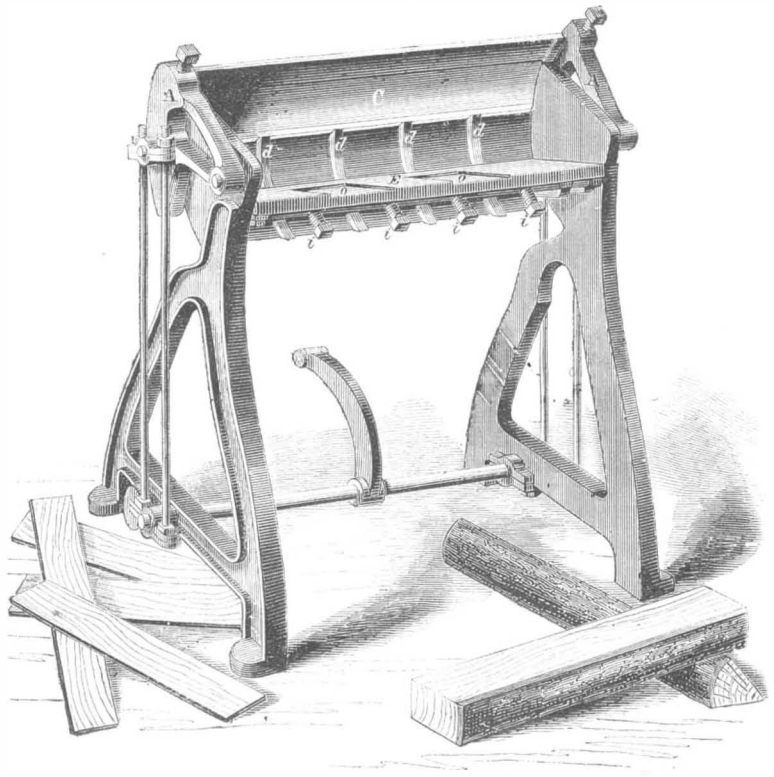
Improved Stave Machine.

The annexed engraving represents an improved machine for cutting barrel staves from bolts of steamed wood-operating similar to cutting a slice from a cheese. It wastes no material in chips, sawdust or shavings, and makes a smooth and handsome stave suitable for flour, salt, or other dry barrels. The inventor states that it will cut 60 staves per minute, or 3,600 per hour, and that there are machines now running which cut 500,000 per month. The economy of material is such that 1,000 feet of



SISSON'S PATENT STAVE MACHINE.

4-inch plank will make from 2,800 to 3,000 good merchantable flour-barrel staves, or one cord of split bolts will make from 1,200 to 1,500.

In its construction and operation it is exceedingly simple. A curved thin knife, C, with a very sharp edge is secured to the frame, A A, and receives a vibratory motion along an arc corresponding to the curve of the barrel. The bolt, thoroughly steamed, is placed upon the bed, E, and pressed against the guides, *d d d d*, which are in the rear of the knife at a distance equal to the thickness of a stave. As the knife is drawn down by the machinery, a stave is pared from the bolt, and as the knife rises the bolt is pressed back by the workman against the guides, *d d*, ready for a second cut.

A groove is formed in the bed, E, under the edge of the knife, and a piece of wood is inserted with the grain vertical to receive the edge as the knife comes down; and as this wood is worn away, it is raised by the screws, *i i*.

Two recesses, *o o*, are formed in the bed, E, each two inches deep and eight inches wide, to enable the workman to handle the bolt easily, and to obviate any danger of cutting his hands.

The knife is so secured to the frame that it may be readily adjusted to cut staves of any desired thickness.

The patent for this invention was granted Sept. 4, 1861, and further information in relation to it may be obtained by addressing Sisson & Sage, at Fulton, N. Y.

SMITH'S SICKLE BAR FOR HARVESTERS.

There is great difficulty in grinding the teeth of mowing and reaping machines when they are fastened to the bar in the usual manner; indeed it is impossible to grind the edge down to the base of the teeth. Ezekiel Smith, of Cold Spring Harbor, N. Y., has invented a mode of securing the teeth to the bar, which, while it holds them perfectly firm in their places, enables them to be readily taken off to be sharpened. The invention has been assigned to the inventor and J. B. Jayne and J. T. Wiggins. It is illustrated in the annexed engravings.

Fig. 1 represents one modification of the plan and Fig. 2 another. As shown in Fig. 1, rivets, *a a a*, are secured rigidly to the bar projecting upward a sufficient distance to pass through a tooth, C, and through the covering bar or plate, B. In each tooth two holes are made of sufficient size to permit the rivets, *a a*, to pass through freely, and holes of the same size are made in the plate, B. But the holes in the plate, B, are elongated with converging sides, so that as the plate is pushed along endwise, the narrower ends of the holes will grasp the rivets firmly. The upper ends of the rivets are enlarged, and the sides of the holes in the plate are made flaring upward, so that when they grasp the rivets, the plate, B, is drawn down upon the teeth, holding them in place. A screw is passed through the plate, B, into the lower bar, and by the insertion of this one screw, all of the teeth are secured to the bar.

Fig. 1

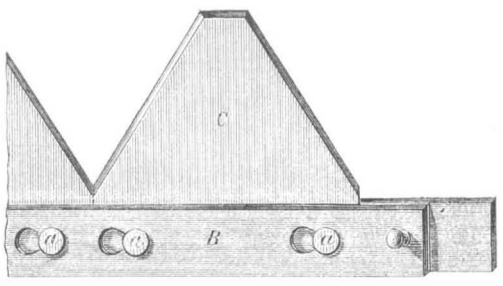
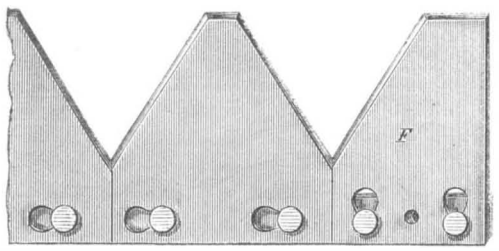


Fig. 2 represents a modification of the device in which no covering bar is employed. In this case the tapering slots are made in the teeth, and the blank tooth at the end of the bar has the slots turned at right angles with the bar. The teeth are placed in position by slipping the rivets through the wide

Fig. 2



end of the slots, and sliding the teeth along to bring the narrow ends of the slots under the rivet heads. The blank tooth, F, at the end of the bar is slipped over its rivets and drawn forward, when a single screw holds it in place, and thus secures all of the teeth.

In machines in which rivet heads upon the upper sides of the teeth would be objectionable, they may be countersunk into the teeth and made tapering.

The patent for this invention was granted April 22, 1862, and further information in relation to it may be obtained by addressing the patentee, Ezekiel Smith, at Cold Spring Harbor, Suffolk Co., N. Y.

COTTON IN EUROPE.—Thurlow Weed says in a late letter from Europe, "There is beginning to be much anxiety in France about cotton. Their diminished supply will be exhausted in six or eight weeks. This will deprive several hundred thousand people of employment, for whom, in such an emergency, the government must furnish bread. Hence, the government appeals to us for cotton. Other governments are not unlikely to unite with France in an earnest appeal on this subject."

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